American Forestry

VOLUME 28 MARCH, 1922 NUMBER 339

The American Forestry Association

Washington, D. C.

Declaration of Principles and Policy of The American Forestry Association

IT IS A VOLUNTARY organization for the inculcation and spread of a forest policy on a scale adequate for our economic needs, and any person is eligible for membership.

IT IS INDEPENDENT, has no official connection with any Federal or State department or policy, and is devoted to a public service conducive to national prosperity.

IT ASSERTS THAT forestry means the propagation and care of forests for the production of timber as a crop; protection of watershed; utilization of non-agricultural soil; use of forests for public recreation.

IT DECLARES THAT FORESTRY is of immense importance to the people, that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 735,000 people; pay $367,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.

IT RECOGNIZES THAT forestry is an industry limited by economic conditions, that private owners should be aided and encouraged by investigations, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon National and State forest reserves for the benefit of the public.

IT WILL DEVOTE its influence and educational facilities to the development of public thought and knowledge along these practical lines.

It Will Support These Policies

National and State Forests under Federal and State Ownership, administration and management respectively; adequate appropriations for their care and management; Federal co-operation with the State, especially in forest fire protection.

State activity by acquirement of forest lands; organization for fire protection; encouragement of forest planting by communal and private owners, non-political departmentally independent forest organization, with liberal appropriations for these purposes.

Forest Fire Protection by Federal, State and fire protective agencies, and encouragement and extension individually and by co-operation; without adequate fire protection all other measures for forest crop production will fail.

Forest Planting by Federal and State governments and long-lived corporations and acquirement of waste lands for this purpose; and also planting by private owners, where profitable, and encouragement of natural regeneration.

Forest Taxation Reforms removing unjust burdens from owners of growing timber.

Closer Utilization in logging and manufacturing without loss to owners; aid to lumbermen in achieving this.

Cutting of Mature Timber where and as the domestic market demands it except on areas maintained for park or scenic purposes, and compensation of forest owners for loss suffered through protection of watersheds, or on behalf of any public interest.

Equal protection to the lumber industry and to public interests in legislation affecting private timberland operations, recognizing that lumbering is as legitimate and necessary as the forests themselves.

Classification by experts of lands best suited for farming and those best suited for forestry; and liberal National and State appropriations for this work.

AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

WASHINGTON, D. C.

PERCIVAL SHELDON RIDSDALE, Editor

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THE ASSOCIATION'S FORESTER

DEVELOPING a plan which has been under consideration for some time the Board of Directors of the American Forestry Association has secured a special fund for the employment of a technical forester. A committee has selected Mr. Ovid M. Butler, assistant director of the Forest Products Laboratory, at Madison, Wisconsin, for the position, and he joined the Association on March 1.

Mr. Butler is one of the leading foresters of the United States and his several years of service in various branches of his profession fits him admirably for the important duties he will have to undertake as forester for the American Forestry Association.

OVID M. BUTLER

Forester of the American Forestry Association

Mr. Butler is a Hoosier by birth, and was graduated from Butler College, at Indianapolis, Indiana, in 1902 with a degree of A. B. He then spent three years at Indianapolis in newspaper work, first on the Indianapolis Star, and later on the Indianapolis News. In the fall of 1905 he entered the Yale Forest School, from which he graduated in 1907 with the degree of Master of Forestry.

On July 1, 1907, he entered the Forest Service and was assigned to the Boise National Forest, Idaho, as Forest Assistant. After six or eight months service he was made Deputy Supervisor of the same forest, and in the fall of 1908 the Forester transferred him to Ogden, Utah, as Assistant Chief of Silviculture in District 4. In 1910 he was transferred to Missoula, Montana, in the same capacity in District 1, and arrived there just in time to participate in the worst fire season which that district has ever experienced. A year later he was promoted to Assistant District Forester and transferred back to the intermountain district in charge of Silviculture.

He spent part of 1914 and all of 1915 in directing a study of lumber distribution. This was a part of the lumber study series conducted at that time. The results of his work appear in Reports Nos. 115 and 116, entitled "Distribution of Softwood Lumber in the Middle West." One report deals with the wholesale, and the other with retail distribution. They are the most comprehensive analyses of the distribution of lumber from the mill to the ultimate consumer that have ever been made. In April, 1916, he was transferred to Albuquerque and placed in charge of the office of Silviculture in the Southwestern District; and on the outbreak of the war, a year later, he was transferred to Madison as Assistant Director of the Forest Products Laboratory, a position which he has since occupied.

He participated in the preparation of the now much quoted Capper Report, and is the author of the chapter in that report entitled "Forest Depletion and Lumber Prices." From time to time he has written quite a number of articles which have appeared in different periodicals. Among them are the following:

"Forest Conservation by Better Utilization," "The Price We Pay for Lumber," "The Forest Supply in Relation to the Needs of Industry," "Research and Boards," "Wood Using Facts for Wood Using Lore," "The Movement of Wholesale and Retail Lumber Prices in the Middle West in Relation to the Timber Supply," "The Relation of Research in Forest Products to Forest Administration," "The Government and the Forest," "Built-up Wood," etc.

Mr. Butler will make his headquarters with the Association in Washington, but a great deal of his time will be spent in field activities so that he can keep in close touch with forestry conditions in various states and assist in efforts to secure better forestry laws, to aid in organizing forestry activities in the states and to attend meetings at which forestry is to be discussed. There will undoubtedly be a widespread demand for Mr. Butler's attendance at conventions and other gatherings and for his advice and guidance in forestry development of various kinds. His services are expected to add largely to the effective work which the Association is now doing and to make its accomplishments greater than ever.

AMERICAN FORESTRY

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LOGGING MAHOGANY IN TROPICAL WEST AFRICA

By Veeder Bertrand Paine

THERE are many features incident to getting out mahogany logs in tropical West Africa, and many difficulties to be overcome from the stump to the hold of a cargo steamer enroute to the mills in the United States.

The title to the trees must first be secured from the native chief, and this alone presents problems to be solved by the white man. For many years the natives have shipped squared mahogany timber to the Liverpool market, and trees of the size required to comply with the Colonial Forestry regulations, nine feet in circumference, are not plentiful near to the banks of log-driving streams. Having secured a goodly supply of trees, I began the work of organizing logging operations, on a scale sufficient to furnish five to six million feet to the mills in the United States annually.

A MAHOGANY LOG HAULING TEAM

Competition between men of various tribes to get the heavy logs to water in the quickest time frequently is a greater spur to hard labor than wages, abuse or praise.

No white man accustomed to logging work was to be found on the coast. Neither cattle nor horses can live there; there are no factories or shops to supply the requisite tools; no streams cleared and fit for driving logs; no booms in the Ancobra for holding logs in time of freshets; no harbor in which steamers can take cargo, which must be brought alongside in the open sea. It is four weeks by mail to the home office; one month by supply steamer from English ports, with countless minor difficulties to meet and new ones continually cropping up, so I may be pardoned for suggesting that this was rather a large order.

Each one of the great cargoes and each individual log in it has a history that would, if told, be of interest and full of strange incidents and exciting adventures, but I will present as briefly as I may, the methods by which the logs are gathered in such quantities, brought to the shipping point and placed on board the chartered steamers. The entire enterprise aptly has been termed a pioneer proposition and to describe its working developments, we will start at the stump.

The foundation for a logging operation has already been laid by the ownership of the timber, and with an unlimited supply of the sinews of war always at command, the next important problem to be solved is the

question of labor. The term labor has, on this coast, an unusual significance, covering as it does, not only manual, but as well the work commonly performed by horses, mules, oxen or by steam power. The native of the Gold Coast is not running about looking for a job in a logging camp, preferring to fish, hunt, trade or to do nothing, letting his wives support him by their labor or by their wits, for the women are very keen as merchants. The main incentive for the young man to labor for wages is to earn the money with which to buy a few wives, the which accomplished, he needs not to toil nor spin. Another obstacle in the way of securing labor is the lack of confidence in the matter of payment of wages when due. It seems that both natives and Europeans who heretofore have essayed to get out logs, either failed to bring their logs to a shipping point or, if succeeding in this, forwarded the lot to the Liverpool market; the laborer being forced to wait for the return from brokers' sales, and these more often than otherwise showing a debit balance for freight and selling charges.

CLEARING THE WOODS TO BUILD A LOGGING CAMP

The mahogany logging camps in West Africa are constructed to last for several years and to hold hundreds of native workers, and must be so arranged that different tribes or various clans of tribesmen may be somewhat separated.

Another and prevailing feature of hiring did not meet our approval; the practice being perhaps made necessary by this same lack of confidence, to pay each man on hiring, six months' wages in advance, no more to be paid until the end of the twelve months term of hire. This plan had its advantages and its disadvantages to both master and man. The laborer, if so inclined, might after receiving his advance, fail to show at roll call, and the places that knew him well know him no more. On the other hand, the employer might, and often did, by smooth talk and fair promises, get his output for the season safely on board a homeward bound steamer, taking passage himself, leaving the unsuspecting laborers with their unpaid balances. The native employer finds the evading of payment more difficult. He cannot run away; he must stay and face the music. He ships his logs on the same kind of promises, but when, after long and weary waiting, the logs are sold and the sales account is received, the balance due, if any, is absorbed by the local merchants, who have furnished tools and supplies and perhaps a little money, holding a lien on the logs as security. Again the laborer is found not worthy of his hire.

The contract system also is in vogue in some parts of the coast. The white man leases a tract of land said to carry mahogany timber trees. He then gives out to a native jobber a contract to bring to the mouth of the river a specified number of logs. The jobber hires his men and gives them an advance on wages, the cash being furnished by the white man. During the year, and as the work progresses, payments are made to the jobber, who spends the sum in other ways than in payment of

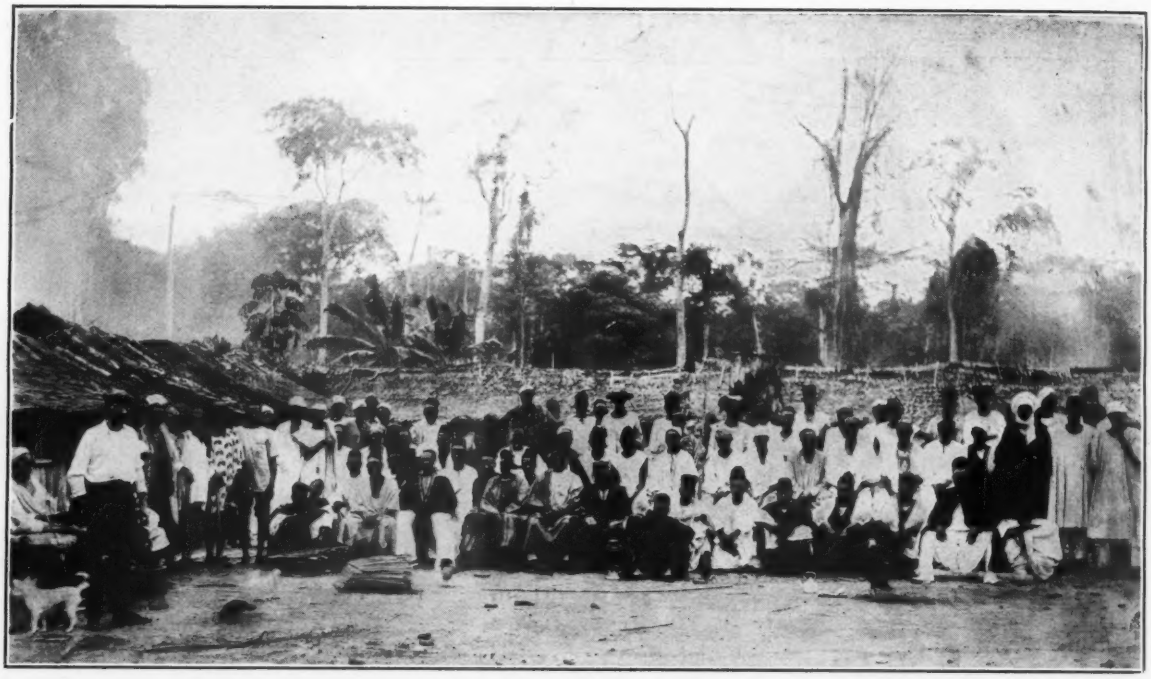
wages, and just before the beginning of the rainy season, when the men are most needed and there is no time to fill their places, they demand a settlement and payment of wages due. As nothing is due to the jobber, the white man refuses further advances; the jobber has spent the money; the laborers leave the work; and when the driving water comes the logs are left to come or stay, most of them stay. The high waters overflow the river banks, the floating timbers take to the woods and when the waters recede, are left in inaccessible places, hard to find and the cost of returning them to the bank is greater than to cut and haul new wood. The crew may bring suit and attach the logs where they are, but there is not any real value and both wages and logs are lost. These and similar misadventures do not serve to inspire confidence of natives in employers of labor.

In beginning active logging, I declined to make advances or to let contracts, insisting on the American plan of doing business, hiring men for a twelve-month term on monthly wages, payable at the end of every three months. The people very soon learned that we had come to stay and that the pay was sure and the system gave entire satisfaction. The major part of labor on the Gold Coast is imported from Liberia and mostly from that district known as the Kru country.

The Government of Liberia demands a fee of five dollars a head for each man taken out of its country. To secure laborers from that country an agent must be sent to engage the required number and ship them on the first steamer calling at the port. Passage money is paid and on landing at Axim the entire party is lined up in front of the office, sorted into sizes and graded by apparent capacity for hard labor, names taken and wages fixed for the year on each grade and each individual, and the entire lot taken before the District Commissioner, who asks each one as he touches the pen to verify his signature by mark, "You 'gree?" If the man can say yes he does so, if not he grins and retires down the line. The head man of the gang usually speaks for all. The days of waiting for a steamer at the point of departure and the two days of practical fasting en route, result in a very lank and hungry looking company and the change in their appearance after a week or two with the new Massa is remarkable. The Kru-men or, as they are called Kru-boys and this regardless of age, are either beach men or bush men, the former best for boatmen

CALLING THE ROLL IN A MAHOGANY CAMP IN TROPICAL WEST AFRICA

Most of the native workmen are secured from Liberia, the government of which country requires the payment of a tax of five dollars each for every laborer who is allowed to leave to work in another country.



A LOGGING CREW OF WANGARIAS—FROM THE DESERT TRIBES—ALL MOHAMMEDANS

or stevedoring and stowing cargoes; the latter are from the interior and best adapted to the work of logging.

After the crew has "signed on," as it is called, the requisite number of cooking pots and a large basin to each ten men, are furnished them, a generous ration of rice being issued to the cook of each division; and it often happens that the manager's sense of humanity prompts an issue of rice as the first step in the proceedings.

The Gold Coast native is invariably known by the name which stands for the day of the week on which he was born. The year and the month are not taken into account and the age of a dusky belle is uncertain. There are other parts of Liberia from which laborers are brought; and as the different districts are often either at open war, or are nursing old animosities handed down from one century to the next, the distribution of newcomers at the camps, calls for experience fortified by tactful patience and unlimited authority At best all are clannish. The men from one neighborhood will not mix in the living arrangements of other Liberians from another district They say, "Massa, they be no from my country." If from the same village—"Massa, they be my brothers." To these men "my country" means my native village; "my brother," any man from the same place; and indeed, the men from one neighborhood bear such close family resemblance that without further inquiry one would believe them to be really brothers as claimed. When asked if they have the same father or mother, it is found that, so far as known by them, there is no close kinship. When it so happens that two men are born of the same mother, they stick still more closely together; and, if, peradventure, the same mother and father are held responsible for both, their pride of ancestry is great indeed.

These untaught and entirely uncivilized so-called heathens may well call each other brother. Their unselfishness puts civilized man to the blush. The smallest and youngest will share with his mates the least scrap of food that may be given to him. Among the many small boys that have served as house boys and table waiters, no women are employed for this work, not one ever has been known to fail to share any gift of eatables, no matter how tempting or how small a portion. Often a boy will carry his tid-bit all day and many weary miles and never so much as nibble at it, waiting to join his brothers at the end of the journey. "There ain't goin' to be no core" has no place in the heart of these heathen children.

After twelve years of logging with, at times, fifteen hundred people at work, there are now many old hands who understand our work well, and whether felling trees, cross-cutting logs, hauling, driving the streams or rafting, are competent and efficient. To get from this labor the best results, whether Liberians, natives of the Coast or from the far interior bordering on the desert, requires patience, tact and experience. Flogging is practiced in some quarters but this we do not permit. Kind treatment, patience to listen to grievances, firmness, justice in deciding all matters, but never yielding one jot or tittle to importunities or demands, give satisfactory results.

It often is the case that the native has not understood the white man's order and this may cause him to hesitate and so seem guilty of disobedience To knock the

man down with fist or club, and perhaps beat him unmercifully, an unresisting creature, without a word of explanation, is the practice in places on this Coast, but less so in the British protectorate than elsewhere. Neither as manager nor as a man can I look upon the assaulting of one who is certain not to resist, as other than cowardly and brutal. When one of our laborers fails to do his duty or his work in a satisfactory manner, after a fair trial he is dismissed and paid. Plenty to eat, prompt payment, with a certain dismissal for cause, are forces in the control of black labor, requiring no aid from violence. No difficulty has yet arisen with our labor that one word from "Big Massa" did not settle without argument, nor any disturbance among themselves that a word from the same authority did not quell and this without threats of punishment or show of arms.

In West Africa the success of logging in all its branches depends to an unusual degree on the tact and good judgment, as well as skill, of the camp foreman in immediate charge of the men. He should be able to know to a nicety the amount of work in each division that may be accomplished, not tomorrow or next day, but today. Knowing the size of the trees to be felled, the measurement of the logs to be hauled and the length and condition of the logging road, each set of workmen must be given its task for the day. The axmen and the sawyers know how many trees must be felled and how many logs crosscut, and the hauling teams the number of logs each team must haul to the banking ground. Careful observation with experience, soon teaches the foreman the amount of work of each kind the crew will do, working the full day with everything favorable and the men all seeming to be working with a will After a few weeks of pushing them for a record, it is generally a wise move to meet any indications of a feeling that they are working too hard or too long hours, by a suggestion that tasks or stunts will be given out and that when these are finished for the day, the day's work is done. It will be safe to add to the average day's work as much work as ten per cent and, on occasion, even more than this and as a rule the stunts will be finished and the men in camp long before the ordinary quitting time. The point is that they are men and not brutes, and as each one is desirous of doing something for himself, he puts into the work not only his strength but his will power. He is also, as he says, "a free man," even while at work. After the work of the day is done, he certainly is free to till his little patch of ground, visit his traps set in the creek for crabs or his bush-trap set for dryland meat; to bathe, chop, dance or sleep; and in order to enjoy these privileges he goes at the work with his shoulder well up in the collar, doing the work not like the unthinking horse, but with intelligence and vim. The method is not free from its problems required to be understood and solved. Should the task prove to be lighter than the foreman estimated, the crafty ones on the team are too wise to finish the job too early, lest the foreman considerably increase future tasks, so they dally and put in the time, only appearing at camp at a reasonable hour.

WAITING FOR A HEAVY RAIN TO CARRY THE LOGS DOWN STREAM

The water in the smaller streams frequently rises in a few hours from a mere trickle to a raging torrent and as quickly subsides.

The Liberian laborers live on rice. This is boiled in large iron pots and served by pouring out into basins the size of a large wash-bowl. This rice is supplemented, when circumstances permit, with a mixture of palm oil, pepper pods pulled from the shrub, roots and succulent sprouts of various palms and bamboo plants, leaves of spicy and aromatic bushes, all crushed between two stones rubbed one upon the other, the whole served in another wash dish, in which are placed ready-cooked crabs, snails, small fish and any other meats, the result of their ingenious methods of catching these. The cook places the two bowls on the ground side by side, the men seat themselves within reach and each grabbing a handful of rice rolls it dexterously into a ball, dips it into the savory mixture, tosses it into a very wide open mouth and repeats the operation until both bowls are clean. Rice and salt, with a small sum of money to each on Saturday, called by the men "fish money" is the entire ration issued. The Gold Coast native does not eat

CROSS-CUTTING A MAHOGANY TREE, WEST AFRICA

rice when he can avoid doing so, preferring to live on the food products of his own country—maize, yams, plaintains, bananas, palm nuts and palm oil, sugar cane, with all the native condiments above mentioned besides a host of others. To him no rations are issued, but a fixed sum in cash is paid to each man on the first of every month, with which he buys his own food supplies. Each little clique and clan does its own cooking, has its own pots and pans.

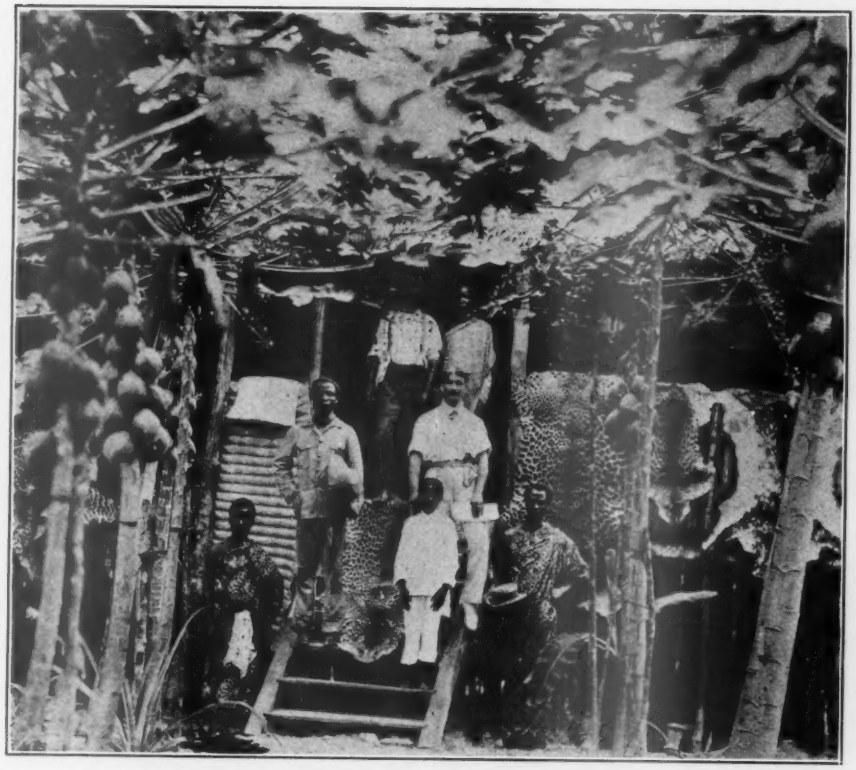
One of the first things to be done after a camp is opened is to clean the stream and put it into the best possible condition for floating and driving logs. In doing this work it is difficult to make the native workmen understand how thoroughly it should be done. A crew sent to cut out old logs, driftwood, fallen trees, and other obstructions from the bed of the creek, over a certain limit, will report on their return that the work is finished according to orders. On inspection these various obstacles will be found practically untouched, only such timbers cut out as might stop the logs on the very highest floods. Called to book, they say "Massa, God bring the big water; log he pass one time." These people rely for many things on the direct help of gods—not the God of the Bible, but their own several gods.

Lest it might prove dull reading, I refrain from narrating particulars of the general work, nor will I give details of the countless difficulties, seen and unforeseen, to be met and overcome; the untried creeks, the ignorant and unskilled labor, the disappointing qualifications and characteristic failings of the lumberjacks sent over to act as foremen and to educate the natives in the use and care of tools; the self-evident disadvantages of five thousand miles and four weeks' time from the base of supplies; the "white man's grave" reputation of the West Coast as a deterrent to securing first-class men from the States to assist in the work; the abnormal and not-within-the-memory-of-the oldest-inhabitant and therefore unexpected, floods in the dry season, or seasons dry when by all precedents since the time of Noah, the floods are due; the entire lack of roads and ordinary means of transportation of camp supplies; besides the other thousand and

TYPICAL HOME OF WHITE LUMBERMAN IN MAHOGANY REGION OF WEST AFRICA

one matters constantly cropping up requiring an offhand decision by the General Manager—the healing of the sick, or, failing in that, the burial of the dead; correspondence with the home office, of the nature of ancient history—two months elapsing before the mail can possibly bring a reply; the unpleasant half hours wherein one feels that the determination not to turn one's back upon an undertaking but rather to stay with it until success has crowned the effort, is an exhibition of stubbornness and pride irreconcilable with the possession of common or even horse sense.

The duties of the manager, as will readily be seen, cover a wide and diversified field of action. He must be ready on his own initiative, as the referendum is two months away, forty days by post and cabling costs one dollar and a half per word each way. The redeeming feature of this self-imposed life in exile in West Africa is found in the multifarious duties here mentioned, and in the fact that one finds the time fully occupied, each day too short for the work; and the same is true of the weeks and months and years Yet, to be entirely content, one needs a touch of Hearn or Stevenson in one's



BUNGALOW OF WEST AFRICAN MAHOGANY CAMP FOREMAN SHOWING PAW-PAW FRUIT AND LEOPARD SKINS

blood or brain, with a dash of Crusoe, the unequalled in all emergencies. In mentioning the characteristic traits of the West African native, including Liberian and Gold Coast peoples, one feature stands out prominently to his credit, and by comparison uncomplimentary to civilized white man. In the performance of an important trust confided to him, he is absolutely reliable and beyond temptation to betray confidence. In sending money to the camps to pay quarterly wages, the only means of carrying the cash is on the heads of carriers. The entire sum is in silver coin, British florins, shillings, six-pences and three-penny pieces. In this coin an equivalent of one thousand dollars weighs sixty pounds avoirdupois, a load for one carrier. The money is placed in canvas bags and carefully sealed with wax. To reach the farthest camp these men must walk five days through the forest, sleeping where they can, but usually at some native village. I have many times sent a single laborer with two hundred pounds, starting alone and unattended, to the farthest station and as high as six hundred pounds or three thousand dollars, by native laborers in charge of a native clerk to the different camps; and, doing this dozens of times, have never lost a penny through the default of these honest and illiterate heathen. The carrier's wage is twenty-five cents a day, with six cents for chop money, the clerk, in charge only because he can read and write and speak a little English, sign and receive receipts, drawing a salary of twenty dollars a month. The great continent of Africa spread out before them where to choose, the inbred characteristic herein mentioned becomes a valuable asset to his white employer.

The rainy seasons are best for hauling, the skids over which the flattened logs slide along the logging road are wet and slippery and this greatly facilitates the work. In a dry spell of weather the foreman resorts to the expedient of placing on the skids the juicy, succulent leaves of the plaintain, in size six to ten feet long and two to three feet wide, with a large stem full of sap. These placed in front of the log for it to slide over, are as good as twenty men added to the team.

Hauling after a time becomes monotonous, and an occasional day or two at floating logs away from the landing is welcomed by all the laborers who "savey swim." River driving is under most conditions devoid of the elements of romance, at times full of danger, but seldom is carried on at night. No one inexperienced in driving logs can understand the disadvantages and awkward possibilities of night work. A shadow will deceive the most practiced eye, but will not serve the usefulness of a real log in supporting the luckless driver who leaps upon it in his work. In tropical Africa success in log driving is to be gained only by constant vigilance and being always ready to take advantage of the water the moment it rises. Without warning, a creek may fill with water to a floating stage, and in an hour or two the flood will have subsided, leaving the stream in its normal flow, and the log will never float "with the water that has passed."

On the larger streams, the mahogany trees have long since been cut; some of them in recent years have been made into logs and taken to market, but by far thegreater number have been felled during the centuries that the continent has been inhabited. This has been done in clearing ground for villages and patches of land for planting crops; the process is still going on, though to less extent. These old clearings are now grown up to young forest, but the mahogany trees are missing. Hundreds of trees have been felled and never hauled, the native logger having exhausted his resources and so abandoned the tree to moulder and rot where it fell. This kind of waste is still going on, the ambition of the native to become a timber merchant being to his mind achieved when a few trees have been cut down, and in this condi-

COMING INTO THE BANKING GROUND WITH A MAHOGANY LOG IN TROPICAL WEST AFRICA

tion the logs are offered for sale, the only requisite before delivery being an advance of cash to pay labor. In most cases the advance is used for other purposes and the logs lie and rot, serving meanwhile as a bait for further advances from new purchasers. Along all floating rivers and creeks, thousands of the finest and most available mahoganys have been used in the making of canoes or dugouts, such as the natives use for river travel and transport. Other mediums of destruction have assisted in so stripping the forests of their mahogany trees that the logger is now obliged to utilize the smaller creeks and tributaries and even here, though in lesser degree, are found the same conditions.

On the small streams one must rely entirely on rainfall to drive logs to the main rivers. The more thorough the work of preparing the bed of the stream, the less water will be required, but at best the rains must fall. The heavy showers do not, as a rule, time their coming to suit the riverman. More often than otherwise, they begin to fall late in the day from four to six o'clock. The rain may fall in torrents for an hour or two and not perceptibly raise the creek at the place the water is needed, being a local shower not reaching any of the country the drainage of which feeds the upper tributaries. The rains that fall far up the creek and beyond the range of local observation are the ones to furnish the water to float the logs. Throughout the season a watch must be kept both night and day on the bank of the stream to notify the foreman of a raise of water, and, if in the night, he must rouse the men. It may be that all are asleep and the camp as quiet as the night is dark. Comes the watchman to the white man's bungalow with "Massa! Massa! Water he live for come!" "Go quick! ring bell!" is the order, and in a moment the camp bell is sounding its warning and the men are quickly astir and ready for the work in hand.

Without a path cut all along the bank and close to the edge it would be impossible to get near the creek or to the logs to work them, even in the day time. To ride the floating rear at the tail of the jam is to invite collision with the overhanging branches, vines and grasses with edges like saw teeth, only to be swept at last into the water. Under ordinary circumstances such an incident would be an occasion for jokes and merriment to the rivermen lucky enough to witness the chagrin of their fellow, but here, with the swift running current, the banks submerged and armed against approach by a network of repelling brambles too flimsy and slender to sustain the man who grasps them, and through which it would be torture to penetrate if that were possible, the situation of the driver is serious at best and in the night conditions are present which in the matter of safety to life and limb leave much to be desired.

Before the dry season ends, a quantity of dry bamboo has been gathered and stored under cover, split into narrow strips, tied into small bundles of suitable size for use as torches, to light as far as is possible the river drivers at their work. Lanterns are practically worthless, the light easily extinguished and failing in extremities and when life may depend upon a moment of light. There is no need ever to want for volunteers to carry these torches, as plenty of the bushmen "no savey swim,"

so they follow along the path and light up the water as well as is possible for the men at work on the logs. At the first alarm the foreman, taking with him a few men, has hurried down the stream to the head of the jam, where it lays as it was left on the sudden subsidence of a preceding flood; the remainder of the crew in charge of the headman or native sub-foreman, are placed at the several "bad places" in the creek and at the rear, and all in readiness for the waters to rise to log-floating stage. Torches are extinguished to save them for the time of action. The "rise," if it comes at all, may last for an hour, or possibly two, though rarely for five or six but, shorter or longer, there is no stopping of the work until the falling waters ground the logs on the

WEST AFRICAN MAHOGANY LOGGING CAMP CREW WITH WHITE FOREMAN

bottom, there to remain in waiting for another rainfall. The torch bearer's job is no sinecure. Often he is up to his neck in water as the path crosses low places or the mouths of small rivulets up which the back water from the main stream sets far inland, and one hears the sizzle of a torch suddenly extinguished as its bearer loses his footing, it may be just when the non-swimmer is negotiating a pole, one that he himself had placed to serve as a bridge on just such an occasion as this one, but now two feet under water. Should he scramble out on the camp side of the bridge the chances are that he will make a sneak and disappear in the darkness, depending on the nature of the individual, or whether his boss is near enough to stop him. While the work is in progress a drizzling rain is likely to be falling and soon the torch material becomes too damp to burn, though the natives are very expert at keeping these alight under trying conditions. When all have failed, the work must perforce come to a standstill and, unless the catastrophe has been anticipated in time, the crew may be left in places where they must wait for dawn of day or a rescue party from camp to relieve them from captivity.

It may be asked why obstacles are not removed before the work of driving begins. To this it may be said that everything is cut and cleared away as high from the bed of the creek as a man can reach with his machete, the work necessarily being done in the dry season, with little or no water running. The opening thus made through the forest, like a log road or trail, resembles a tunnel with sides and roof of green. When the rains descend and the floods come, when no man can work at creek cleaning, the surface of the water on which the logs float may be eight, ten or even fifteen feet higher than when the dry season work of cleaning was done. The consequences may prove disastrous to the riverman as he passes through one of these submerged tunnels, its roof under water or so nearly so as to force the expert to take his punishment lying down, the tunnel dark enough by day and simply black at night, presenting a situation full of uncertainties, and perhaps as replete with dangers unknown, (always most trying to a man of courage), as the passage through the Colorado Canon, a feat not

lightly to be undertaken. In felling these big trees, the axmen do not stand on the ground nor lay the ax at the root of the tree. The first thing to be done is to cut four light poles and set them up for support of a scaffold made of four horizontal sticks lashed at the required height to the uprights, with more sticks laid across. On this precarious footing the axmen stand and chop all around the tree, which at last falls as it will, selecting its own bed ground, the natives climbing down and slipping away to safe quarters.

In cross-cutting, a ladder must be set up for the sawyers to stand on in starting the cut. Cross-cutting of big timber takes a lot of knowing how, else it is backbreaking work. The native is slow in getting into the right swing, is inclined to ride the saw, pull at an angle, push so as to buckle and bind, can not file or set so as to run free, does not properly block to prevent top binding, nor support the nearly severed log to prevent splitting, and it becomes necessary to instruct him on all these points. The same is true of the use of all logging tools and of the devices for taking advantage of the work in all its branches, and I am strongly impressed with the thought that from my endeavors along this line and the results accomplished by my coadjutors, I may rightfully lay claim to favorable recognition as having done real missionary work. Several thousands of bushmen taught the fine points of intelligent labor; how to prepare and lay the foundations for successful results; to rely on their own efforts rather than upon unusual and occasional manifestations of nature or, to use a favorite expression, "by God's power;" in short, to put them in the way of earning real money with which to buy the things they are at the same time "learning to want" a long step toward becoming "civilized." These items of progress may not entitle the claimant to any of the medals or prizes, rewards for meritorious deeds, yet it all seems like having done a vast amount of good to a large number of heathen, paying each individual wages, with board and lodging, for the privilege of educating him in a real, practical industrial school than which nothing will better serve to civilize or modernize the West African. If this educational work has been supplemented by examples of clean and decent living, the care of the sick and wounded, burial of the dead; prompt payment of obligations; patience with the ignorant and stupid; justice and kindly treatment for all, then it can not successfully be denied that some fairly good missionary labor has here been accomplished.

THE MILL CAN NEVER GRIND WITH THE WATER THAT HAS PASSED

Unless the logs are ready for floating when the small streams rise suddenly it may be a long time before there is enough water to carry them out, so night and day the camp foreman must be ready to rush his crew to the stream when water comes.

Quite naturally the question arises—why continue in the twentieth century to haul logs with man power? Since neither horses, mules nor oxen can be used, why not try the various kinds of steam power; cable ways,

skidders, yarding engines, pole roads; tramways, railways, slides and other devices known to the logging fraternity?

Let us take it for granted that this matter has been given merited investigation and the use of the known methods found unsuited and not adaptable to the conditions. If there were real forests of mahogany, or if the trees could be found in groups or in ridges or in numbers in any locality, as is the case with the timber in temperate zones, modern, up-to-date methods might be used in logging. Of the mahogany tree, it may be said that it is "lost in an impenetrable forest."

Surrounded by hundreds of trees of different kinds and of all sizes, these magnificent monarchs of the woods stand apart from other members of the family and seldom more than three or four trees near together, and more often standing alone with no other mahogany tree in sight. In fact, the trees to be felled are so scattering that roads must be built to each one, and so few in number that the cost of setting up logging machinery and moving it as the timber supply within its reach was exhausted, would deliver it to the banking ground by the primitive method, then the cost of the machinery, difficulty in landing from the steamer, and the almost impossible fact of moving it to the work, all this and many other expenses incident to the environment, make the man power most economical. Logs to be hauled, whether flattened on one side or squared, are leveled or rounded at the end in form like a sled runner, to slide more easily over the round skids laid across the road and four to six feet apart.

The hauling line is a one and one-quarter inch rope, attached to the log as shown en the photograph "taken by our own artist on the spot."

Determined to make some advancement over the methods in vogue when David was gathering material for the building erected later by Solomon, the writer decided on experimenting with the caterpillar which lays its own track, as it crawls along over softish ground and minor obstacles. Had just succeeded in getting everything in shape for a thorough working tryout, when "grimvisaged war upreared his wrinkled front." Native labor became an uncertain quantity; cargo steamers were commandeered, the caterpillar ceased crawling, and this method of logging in tropical West Africa is still in the experimental stage.

MAHOGANY LOGS SQUARED FOR THE ENGLISH AND CONTINENTAL MARKETS

The work of getting out the heavy timber from the wood to the seacoast and the steamer has to be done by man and animal power owing to the nature of the country and the distance from European or American sources of supply.

THE MAGIC CUP

By Arthur Newton Pack

European Commissioner of the American Forestry Association

THE legends of almost every race and people are full of references to a magic cup which refilled itself as fast as it was emptied. It was a charming idea, none the less attractive in these present days of prohibition, and while science has as yet found no way to fulfill this particular dream, in other fields at least there has been a pretty close attainment of the ideal. At the gates of nearly every city and town of Continental Europe lie countless pleasant looking woodlands which from year to year appear but little changed, yet forming a permanent source of supply for regular assured quantities of fuel and lumber free of freight charges.

The trouble is that most of those who travel abroad see only the forests and miss the magic of it entirely.

"Yes," said a friend of mine the other day, "I remember seeing some very beautiful woods near Paris, but I don't suppose they interested you, as they all looked naturally grown and I suppose there was nothing to do with lumbering or forestry about them."

Nevertheless, it is forestry, as developed by a nation with two hundred years of practical experience, that permanently maintains those very woods my friend saw, and for no other reason than that the profit derived therefrom pays all the costs and carrying charges. It is as much a misconception to interpret forestry solely as the science of setting out regular rows of little tree seedlings as to consider the forester merely as a student of tree diseases and Latin names. Forestry concerns itself with every phase of forest propagation and use, just as farming with the annual crops of the field and garden.

OLD STUMPS AND NEW TREES

If we can only make every man, woman and child appreciate the danger of fire and eliminate it to the degree that European nations have done, we will soon find ourselves well on the road to realize the perpetual forest dream.

The story of the town, city or state owned forests of Enrope is not new to many of us. Although the excessive advertising given to a few such plans in Germany and Switzerland tends to obscure the general character of the development, the movement in all probability originated in France, and has there for more than a cen-

THE FOREST AT OUR DOOR

At the gates of nearly every city and town of Continental Europe lie countless pleasant looking woodlands which form a permanent source of supply for regular assured quantities of fuel and lumber free of transportation charges.

tury been widespread. The known vagaries of political administrations may cast some doubt upon the reports of tremendous success and generous profits, but when we find a private corporation owning a forest and perpetually maintaining it at a comfortable profit, as is also the case both in France and a section of the Black Forest of Germany, we must recognize that the matter is worth investigating. I confess that I have never visited one of these propositions without thinking of our own clubs and private preserves, of the Adirondacks, the Catskills, and the White Mountains, and the great potential wealth that will some day be developed by their owners.

That here in America we have plenty of land and to a small degree still a few low grade trees near our great wood-consuming centers, it is evident to the casual traveller, and the fact is being better emphasized every year through the reports being prepared by the newly constituted forest commissions of our states. But somehow the magic formulas transplanted from Europe fail to work out in American dollars. In the first place the maintenance of a perpetual forest involves quite different logging methods than are common in the United States. Instead of the easy, machine-like cutting of an entire area, the lumberman must only cut scattered trees, so selected as to best encourage natural growth, the volume of timber cut being dependent upon the volume annually added by Nature to the wood content of the forest. Obviously the greater amount of ground to be covered largely increases the cost of operation; but where the forest is located near the market for its products this charge is readily absorbed by the saving of transportation costs. When we consider that 60 per cent of the present price of lumber in our eastern states represents what we pay the railroads for bringing it from the Pacific Coast, this is not hard to understand. The added cost of logging by the new method is not the real stumbling block; it is the lack of forests near our chief markets for wood products. We have destroyed beyond possibility of valuable reproduction by natural methods practically all the forests in the eastern part of our country, and are forced to start again from the very beginning and create them artificially. It is not the failure of the formula, but the first cost of the Cup which staggers.

All of Europe once pursued the same destructive policy and faced the same problem. France, devastated by the German army, is facing it again today. How is it that Continental European nations can go through all the labor of planting trees and the years of waiting thereafter and still find the operation profitable? Simply because the people are obliged to foot the bill or have no lumber,

WE MAY COME TO THIS

This woodland of beech outside a great European city furnishes both a recreation ground for the people and a permanent supply of lumber and wood.

we are told. Yet, when we come to investigate we find that ordinary lumber prices in Europe are not a great deal higher than those which we have had to pay from time to time. No, there is another factor which enters in, and that factor is coal. Forestry had its beginnings in Europe not in a demand for lumber but in a demand for fuel wood for heating buildings where men lived. The traveller in Europe seldom finds central heating and coal furnaces unless it be in the larger and more modern cities. Europe has not the coal to do it. The old-fashioned air-tight wood stove is everywhere and not coal but wood is king.

What does this mean to growing forests? Simply that the tops, branches, and even the twigs, for all of which we have little use, bring high prices as fuel, and it is their utilization which returns the extra cost of planting. When a town or private owner plants out the land a great many more seedlings must be used than are eventually desired as mature trees; first, because many will die of their own accord; and second, because unless trees are planted very close together during the first few years they become squat, limby, and of less value. In Continental Europe the removal and sale of the weakling trees and of the necessary thinnings for the health of the fore will often, after fifteen years, pay back the entire original investment, and there is no interest to accumulate and compound. In America we can get practically no return until a cycle of forty or sixty years at least is run.

IN A MUNICIPAL FOREST

The municipal forest movement in all probability originated in France. This beautiful forest of spruce, owned by the French government, yields from its annual growth a generous supply of timber for the surrounding neighborhood, pulpwood for paper manufacturing, and bark for the tanneries. Under a careful system of selective cutting, it continually reproduces itself.

In England, people burn coal not only in the factories and furnaces, but in their open fireplaces, a habit of many, many years. Yet there, too, they are planting out new forests and expect that the investment will pay; and it will pay, not perhaps so well as some other high yield investments, but because England must have the wood for lumber and realizes that the foreign sources upon which she was accustomed to draw are running dry. Although she cannot get the same high returns from fuel wood and early thinnings as in France and Germany, she does believe that by the time these new forests do come into real production, half a century from now, the people would rather foot the bill than go without lumber. The British government is doing everything it can to make that bill as small as possible. The obstacles of habit in wood utilization are squarely faced, and endeavor is being made to meet the competition of coal and introduce a more complete utilization of wood than has as yet been known.

Here is a plan which we can well consider. Many of its phases have already been incorporated into Federal and State forest laws of the United States, but we are still behind all of Europe in appreciating the growing necessity for really active measures of forest development. As has been shown in previous numbers of the American Forestry Magazine, the experience of a number of our private lumbering corporations in the east and south demonstrates how a closer utilization of forest products and a more careful system of cutting to encourage natural reproduction is already justified in the terms of profits. Now we see that, in appreciation of the changing attitude of our wood using industries, a few of our towns, particularly in New York state, are taking the risk in planting municipal forests, and who can doubt that their foresight will be justified with generous returns. The destruction by fire of mature forests and areas of second growth remains our most serious problem. If we can only make every man, woman and child appreciate the danger of fire and eliminate it to the degree that European nations have done, we will soon find ourselves well on the road to realize that perpetual forest dream, and insure for all time a steady and constant supply of the wood and paper upon which we all depend.

THE SYCAMORES

By Joseph S. Illick

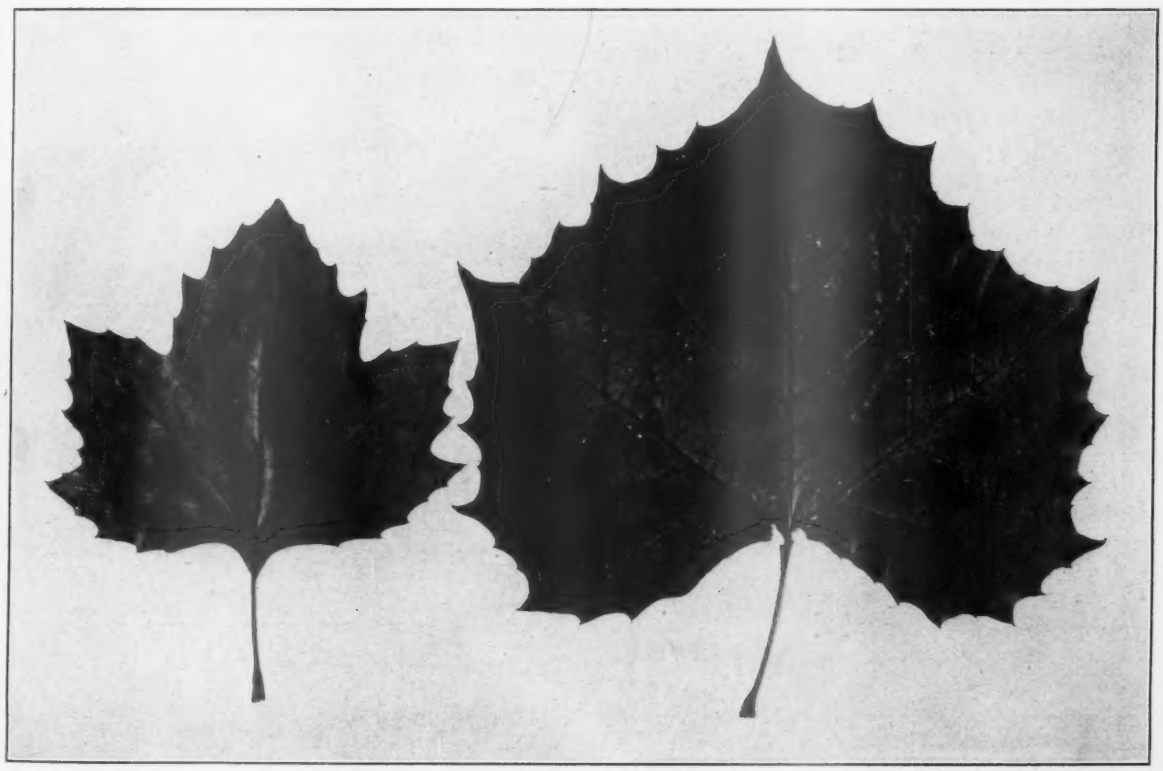
ALL sycamore trees belong to the plane tree family. Only six different kinds are known in the world. Three of them occur in southern Europe and Asia. The other three are native to the United States. All of them attain tree size and belong to the group of trees known by the scientific name *Platanus*, which means "broad", and refer to the width of the leaves. The leaf-blades of sycamore trees are not so broad as those of some tropical trees but they are among the broadest found in temperate regions.

The three sycamores that inhabit the United States and the adjoining part of Mexico are the common sycamores, native to the eastern half of the United States; the California sycamore, found only on the Pacific Coast; and the Southwestern sycamore, native to New Mexico and Arizona, and extending westward towards California.

In addition to the native sycamores, another member of the family, native to southern Europe and western Asia, has been introduced extensively into the eastern part of the United States. This tree is really a sycamore, but it is often called oriental plane tree, or just plane tree. It has many good points and is being planted extensively as a street tree, and locally it is looked upon with favor for general ornamental planting. In the city of Washington and in Philadelphia, many specimens have been planted and are now growing well. A few years ago a census was taken of all the street trees in Paris, and out of a total of 86,000 specimens, 26,000 were oriental sycamore. This favorite tree has many desirable characteristics. It grows rapidly, is hardy, and possesses a beautiful crown, gives ample shade, has an attractive bark, and only a few insects and fungi trouble it. It stands in the front rank among our shade and street trees, and in spite of its foreign origin has won a worthy place among ornamental trees.

The California sycamore is also known as buttonwood and buttonball. Its scientific name is *Platanus racemosa*. It is a small to medium-sized tree ranging in height from 40 to 60 feet, and occasional specimens exceed 24 inches in diameter. The trunk is usually short, and often branches near the ground. The branches, like that of all other sycamores, are conspicuously irregular and massive. Its occurrence is usually confined to bottomlands where one finds it near the border of streams. Among its associates are the white alder, black-leafed maple, California walnut, and occasioually willows are found standing by its side.

The Southwestern sycamore usually goes by the unmodified name sycamore, but occasionally it is called



LEAVES OF THE ORIENTAL SYCAMORE (LEFT) AND OUR NATIVE EASTERN SYCAMORE (RIGHT)

The scientific name *Platanus* means broad and has reference to the width of the leaves of the Sycamore, which are among the broadest found in our native trees.

THE UNUSUAL BARK

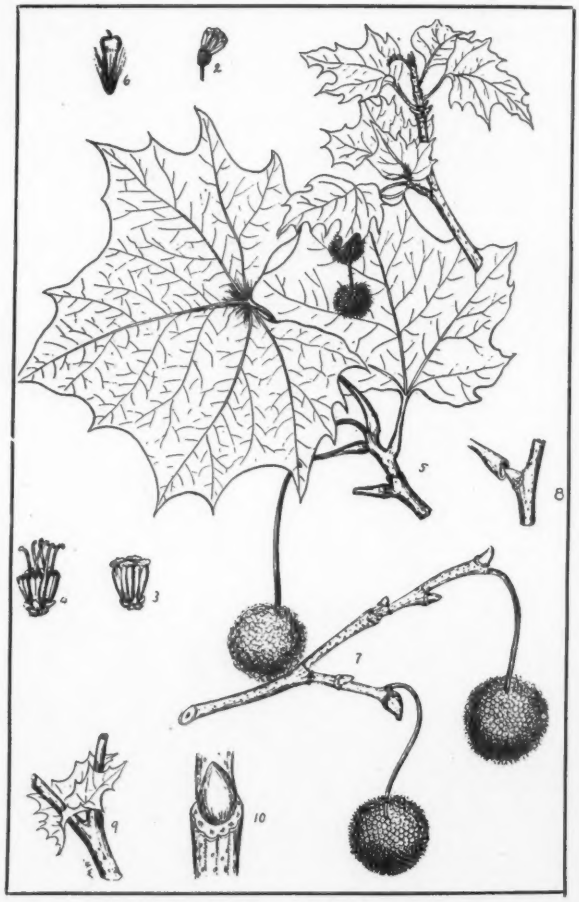
The bark of the Sycamore resembles a patchwork of white, green, brown and yellow. No other native tree has a similar bark.

buttonwood, and sometimes it is given the name buttonball. Its scientific name is *Platanus Wrightii.* It seems proper to call it the Southwestern sycamore for it is native only to the southwestern part of the United States, being found chiefly in New Mexico, Arizona, and extending westward towards California. It attains a height of 80 feet, and usually divides into several stout stems near the ground. Its leaves are quite large, heart-shaped at the base, and from 3 to 7-lobed. This tree is of little commercial importance because of the limited amount of wood that it yields, but it is one of considerable economic importance since it grows chiefly on the banks of streams and bordering bottomlands, and thus prevents the washing away of stream banks, and makes productive vast areas of wasteland that would otherwise remain idle.

The common sycamore of the eastern United States is the largest deciduous tree found in the entire country. In some localities it is called buttonwood, in other regions it is given the name of buttonball, and occasionally one may hear the name plane tree given to it. Its scientific name is *Platanus occidentalis.* The name means "plane tree of the west", and was given to it as a mark of distinction from the oriental plane tree, the scientific name of which is *Platanus orientalis.*

Only two of the six sycamore trees found in the world may be classed as important forest trees. They are the oriental sycamore and our native sycamore of the eastern United States. Scientists tell us that the sycamores are of ancient origin, and that at one time they were far more abundant than now. It is their belief that at one time they were quite common in Greenland and in the arctic regions, and that they also existed in middle Europe, where now no trace of them remains. It is also thought that several additional species occurred in the central part of the United States in early geological ages. Some of the ancient sycamores have unquestionably become extinct, but we should be grateful that there remain such magnificent trees as our common sycamores found in practically every part of the eastern United States, and the oriental sycamore which has no superior as a street tree.

Our native sycamore of the east is found from Maine and Ontario to Nebraska and south to the gulf states and west to Texas. It stands out unique among our forest trees, in that it casts its bark as well as its leaves. All trees do this to a greater or less degree, for it is a necessity of life that the bark yield to the pressure of the growing stem on the inside. As the outer layers of the bark die, they split into scales or crack into plates of varying form and thickness, and finally fall off. In the case of the shagbark hickory, silver maple, and ironwood, this process is not hidden, but the sycamore is



BOTANICAL CHARACTERS OF BUTTONWOOD

1. A flowering branch.
2. A head of flowers with most of the flowers removed.
3. A staminate flower, enlarged.
4. A pistillate flower, enlarged.
5. A fruiting branch with mature leaves.
6. An achene, enlarged.
7. A winter twig with two heads of fruit.
8. Section of a twig showing a subpetiolar bud.
9. Section of a twig showing a stipule, natural size.
10. Section of a winter twig, enlarged.

even more open in proclaiming this fact than any other forest tree.

The most striking distinguishing characteristic of our common sycamore is its thin, smooth, whitish or pale green bark on young trunks, which resembles a crazy patchwork of white, green, yellow, and brown. In winter white is the predominant color, while in summer there is a tendency towards green and brown. In summer the bark is not so conspicuous, because the white color of winter seems to be replaced by a greenish to brown color, and then, too, the bark is hidden by the heavy leaf-canopy that is usually present upon the trees.

The leaves are simple, usually heart-shaped at the base, and wavy on the margin. They are from 3 to 7-lobed, and hairy or wooly on the lower surface. The most distinctive feature of the leaf is the enlarged or swollen base of the leaf-stalk. In late summer, just before the leaves begin to fall, one of the delights of the country boy is to ask his playmates to find buds of the sycamore tree. They all walk together to a nearby stream, and then begin to examine the twigs for buds. After a short examination of the twigs, they conclude that nature has made no provisions for next year's growth, and no buds are to be found. A little bit of patience, and somewhat closer examination of the twigs, will reveal, however,

A PLANTED SYCAMORE

It was raised from seed and is making an annual height growth of almost three feet.

AN UNFAILING DISTINGUISHING CHARACTERISTIC

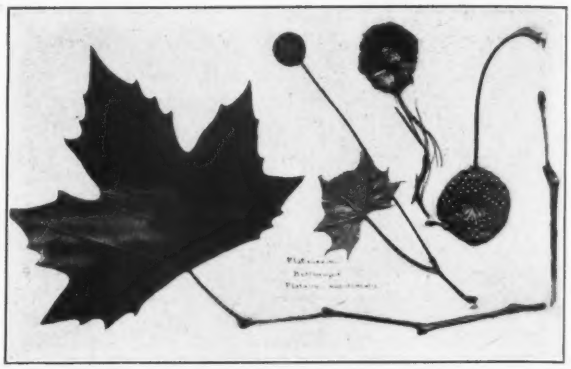
The bud of the Sycamore is hidden under the swollen base of the leaf-stock. The twigs are hairy and surrounded by the large leaf-appendages.

that the sycamore does have buds, but that they are hidden completely under the enlarged stalks of the leaves. It seems as if nature has provided a protective cover for the tender buds until they are fit to withstand the cold of late autumn and early winter. As soon as the buds have hardened up, the leaves fall off, for the buds are then ready to be exposed to the cold. Because of this unusual condition, the bud of the sycamore is often described as *sub-petiolar* bud, which word means "under the petiole". The word "petiole" is nothing more than another name for leaf-stalk. It follows, therefore, that the term *sub-petiolar* bud means "buds that occur under the leaf-stalk". If one will keep in mind this unusual characteristic, it will be possible to identify the sycamore very easily during autumn and the winter months.

Another striking characteristic is the fruit. It occurs in small balls suspended on slender stalks. The balls of fruit are about one inch in diameter and are composed of slender seed-like bodies, densely packed together in a spherical mass. One ball contains thousands of seeds which are made up in a unique way and are well adapted to be scattered about by the wind. One end of each seed is attached to a central marble-like body, from which

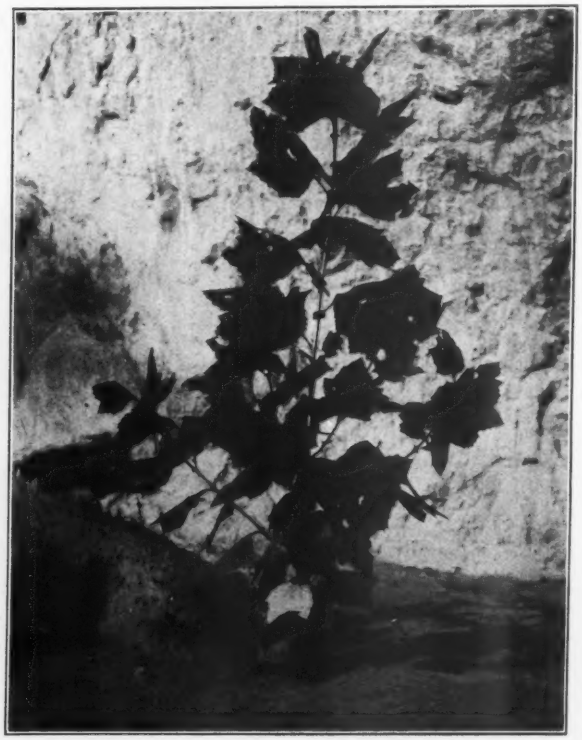
all the seeds radiate and upon which they are packed tightly side by side. A circle of fine, tawny, stiff hairs is attached to the base of each seed. These balls of button-like heads of seeds ripen in late autumn and usually remain attached to the branches far into the winter, and some of them may hang on to spring. During late winter and early spring these balls break up and the hairy seeds are scattered widely over the forest floor where they germinate as soon as warm weather is at hand. The seeds are distributed after the manner of the dandelion seed, with which they have many points in common.

In winter the smooth, reddish-brown, pointed buds are a sure means of identification. They are completely surrounded by a leaf-scar and covered with a single bud-scale. If one takes a good look at the bud of the sycamore, it will be easy to recognize it any time during the winter months. The winter buds and the leaf-scars are so distinctive and such positive characteristics that one cannot confuse this tree with any of its associates.



UNMISTAKABLE IDENTIFYING CHARACTERS

The fruit, flowers and leaves of the Sycamore are all distinctive.



A ONE-YEAR-OLD SYCAMORE SEEDLING

It is almost three feet high and developed on a pile of sand.

The occurrence of the sycamore is also helpful in distinguishing it, for usually one finds it along the banks of streams, the border of ponds, or other wet places. In winter one often sees long wavy lines of sycamore trees which mark the course of a stream. They stand out conspicuously among all other trees because of their white bark and their distinctive crown forms.

The wood of the sycamore tree is uniformly pale brown, sometimes tinged with red. It is a clean-looking wood and presents a good appearance when manufactured, which accounts for the fact that it is used extensively in the manufacture of novelties and kitchen utensils. If one examines the many household articles offered for sale in a 5 and 10 cent store, it will be found that many of them are made of sycamore wood. Brush backs, mouse traps, kitchen utensils, building blocks are among the many articles made of it.

Sycamore wood is not durable, and consequently it is rarely used where it comes in contact with the soil. The average life of untreated lumber in exposed situations is usually placed at from three to five years. The life of individual boards or planks, however, may vary from this figure depending upon the quality of the wood and the condition in which they are placed.

FOUR MASSIVE SYCAMORES

Many years ago a Sycamore Ball composed of many hundred seeds may have been dropped on the spot where these four massive trees now stand.

One of the most desirable characteristics of sycamore wood is the fact that it neither stains nor imparts odor or taste to substances that come into contact with it. This quality, together with its neat appearance, makes it particularly suitable for use in the manufacture of containers.

While sycamore is not one of the principal lumber woods of the country, yet fully a thousand sawmills are annually working it up for the market. In the state of Indiana alone 150 mills report the use of sycamore, and in Ohio at least 100 sawmills are working it up into lumber.

The latest statistics show that more than 35,000,000 board feet are cut annually. About one-half of the total cut is used in the manufacture of boxes and crates. The next largest use is for slack cooperage. It has long been the favorite wood for boxes for plug tobacco, which is easily stained and acquires an unpleasant taste and odor from most other woods.

The principal supply of sycamore lumber comes from the region lying between West Virginia and Missouri and the states of Wisconsin and Tennessee. The greatest supply is located along the river bottoms of the Ohio and Mississippi Valleys and along the main tributary to these rivers.

Just how much sycamore lumber remains in this country is difficult to estimate. It is evident, however, that there is less now than formerly, for it is a bottomland tree and originally occurred in the fertile valleys which have been cleared for agriculture. It seems, however, as if a future supply is assured, for there remain vast areas of low-lying wet bottomland bordering the many streams of the eastern states which are adapted to little else than the production of a forest crop. It is upon these areas that the sycamore tree will continue to flourish and maintain itself.

THE DAUPHIN COUNTY SYCAMORE

With more than 25 feet in circumference at the base, and a branch spread of over 100 feet, it stands near the burial place of John Goodway—the last of the friendly Indians of Central Pennsylvania.

BERKS COUNTY CONSERVATIONISTS

Leading men of Berks County at the foot of the Champion Berks County Sycamore. (Courtesy of Reading Eagle.)

Our native sycamore has many good points, but unfortunately it has a serious enemy in a fungus disease that seems to come around annually, shortly after the leaves have started to develop. When the leaves are about one-third grown, there begin to appear upon them little brownish to black dots near the veins. These dots enlarge rapidly, and sometimes within a few days, and frequently within a week the leaves have completely browned up, shriveled, and begun falling to the ground. The leaves appear as if they had been injured by the frost, but the temperature records of the localities show conclusively that no frosts occurred in the regions. A close examination of the injured leaves shows that the damage was due to a fungus which develops rapidly and does an enormous amount of damage annually. The damage is so great, and the trees are left in such an unsightly condition, that it practically eliminates our native sycamore tree from street and ornamental planting.

We are just beginning to know the real merits of our native sycamore. Not more than a mere start has been made in the use of its wood. With a serious timber shortage now confronting us; it is becoming necessary to use more ordinary woods. It seems fair to predict that before long the wood of the sycamore will play a more important role in the lumber industry of America than it has in the past, and with a better understanding of the good qualities of its wood, the practice of forestry

will include this tree among those worthy to be protected and handled with care. When we really learn to know the sycamore better and understand its forest habits, and are familiar with its growth, we will be glad to give it a place in the forest management of the hardwood forests of the East.

A few years ago the American Genetic Association started a survey of the big trees of the United States by offering a prize to the person reporting the largest trees by groups found within the country. This brought to light many large trees, and among them a massive sycamore at Worthington, Indiana. In 1915 this giant of all our American hardwoods measured 42 feet and 3 inches in circumference at five feet above the ground, and was almost 150 feet tall. It is not unlike other large sycamore trees in that it branches near the ground. Its east branch is 27 feet and 3 inches in circumference, and its west branch, 23 feet and 2 inches in circumference.

Throughout the Mississippi Valley and its principal tributaries, the sycamore grows at its best, but it also attains a large size in some of the river valleys of our eastern states. The "Dauphin Sycamore" standing near Linglestown, Dauphin County, Pennsylvania, is one of the best specimens in the eastern states. It has a circumference of more than 25 feet at the base, and a branch spread of over 100 feet. Most of the older sycamores that stand in our country are hollow, but the Dauphin sycamore shows no traces of any damage or decay. It is one of the best preserved large trees of its kind. Local historians tell us that this tree stands as a memorial to John Goodway, the last of the friendly Indians that lived in central Pennsylvania. It is said that he is buried in an unmarked grave about 100 yards north of this magnificent and massive tree.

Among the historic trees of Pennsylvania is a sycamore growing near Chadd's Ford in Delaware County. It stands close by the house used by Lafayette as his headquarters before the battle of Brandywine, September 11, 1777. This tree is about seven feet in diameter, well-proportioned, and remains as a living and worthy memorial to the great general. Local historians claim that Lafayette was laid under this tree after being wounded in the battle. The words of the historian and the truth of the tradition may be questioned, but the great age and large dimensions of the tree cannot be challenged.

In 1921 the Conservation Association of Berks County, Pennsylvania, offered two prizes in a big tree contest. One prize was offered to the school and the other to the pupil discovering and reporting the biggest tree in Berks County. From every part of the county came measurements of many big trees. When all the results were tabulated the prize was awarded to a big sycamore. The tree that helped win the prize was thirty-seven feet and one inch in circumference near the ground, 103 feet high, and had a spread of branches of 100 feet. This tree now holds the honor of being the biggest tree of Berks County, Pennsylvania. It stands in a field on the old Rothermel farm, one-half mile north of the Half-way House, in Maiden Creek Township. Since the prize was awarded, many pilgrimages have been made to this magnificent specimen of tree growth.

It will not be long until our native trees will play a prominent role in the educational work of our rural schools. As soon as we learn to know our native trees better, writers of geography will no longer picture and describe only the big trees of California and the high Eucalyptus trees of Australia, but will also tell the school children about some of our native trees and other nearby natural wonders. When we learn to know more intimately the things that stand about us, there will accumulate a body of valuable local history that will make each succeeding generation better informed and more satisfied. The attractions of the city have been heralded widely, but the beauties and wonders of rural life have remained unsung. Let us teach the country boy about the wonderful and useful things that surround him and the march toward the city will take care of itself.

THE CALL OF THE WHITE PINES

Lying beside the highway strife,
Hurrying by with busy life
The white pines—silvery green and gray—
Beckon our spirits and seem to say:—

"Leave your restless thoughts, forget
The daily worries that gall and fret;
Come hither and seek a quieter mood
In our sunny, restful solitude".

The fragrance of the monarchs strong,
The carefree notes of the chickadee's song,
And the whispering voices above us, all
Persuade us to answer the pine wood's call:—

"Leave your restless thoughts, forget
The daily worries that gall and fret;
Come hither and seek a quieter mood
In our sunny, restful solitude."

—Eleanor Frances Fullerton.

WOOD FOR PROFESSIONAL AND SCIENTIFIC INSTRUMENTS

By Hu Maxwell

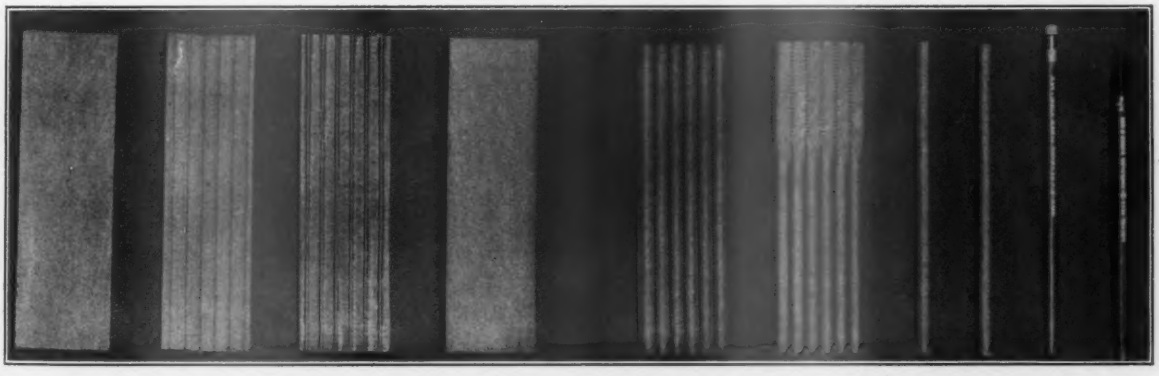
THE makers of professional and scientific instruments in the United States use thirty-five million feet of wood a year, and of thirty-four kinds, ranging in in quantity from twenty million feet for the largest down to a few feet only for those in least demand. Native and foreign woods are on the list, but in both number of kinds and in amount the native species greatly exceed those brought from foreign countries.

Many articles are included in this industry, but they may be segregated in a few classes. Of all the instruments belonging in the professional or scientific class, the most important is the lead pencil. It is a simple and small article, but it is clearly in the professional class. Two materials, sometimes three, form its constituent parts, namely, wood, graphite and sometimes rubber. In bulk it is chiefly wood, but the substance to which it owes its name is graphite, a mineral which forms the writing or marking portion of the pencil. The rubber constitutes the eraser, if the pencil has one. Traced to the final source, all three of these substances are wood, though that claim may appear far-fetched. The rubber comes from the rubber tree; the graphite comes from a mine, if not artificial graphite, and it is believed to have once been coal, derived from wood. Immense time, enormous pressure, and a certain amount of heat, were perhaps among the agents of change which transformed wood into graphite and prepared it for the pencil maker. But in the present article it is not the purpose to go farther back than the wooden slat in dealing with the origin or manufacture of the lead pencil, leaving questions of geology and chemistry out of consideration because they are not strictly to the point.

SOURCE OF THE RAW MATERIAL

The makers of professional and scientific instruments bring woods together from the remote corners of the world, but the accompanying picture represents a typical scene in a northern forest in winter where some of the choicest woods are obtained.

Most lead pencils are of cedar, and by common consent the best wood for this article is the common southern red cedar, known botanically as *Juniperus virginiana*. The tree is an evergreen and is found growing naturally from New England to Florida, extending in the southern



PROCESSES IN LEAD PENCIL MAKING

The pencil slats which will make from three to six pencils each are passed through various machines before the finished article is ready for market. The steps are shown in the accompanying picture. (Photograph by courtesy of the New York State College of Forestry, Syracuse, New York.)

GREAT IS THE LEAD PENCIL

Though the lead pencil is among the smallest of the implements in the professional and scientific class, its manufacture calls for more wood than any other single article in that class; in fact, more than all others combined. Most pencil wood is red cedar, but some other woods are used.

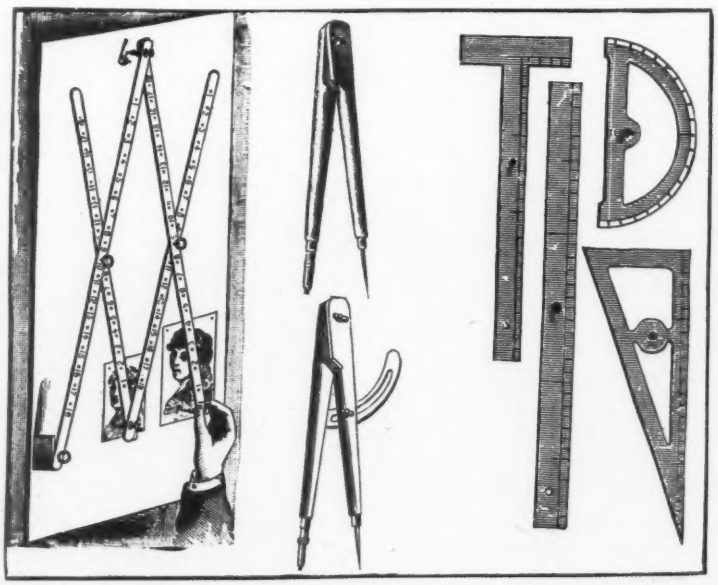
states as far west as Texas in great abundance. Farther north it occurs as far west as Kansas and Nebraska, and northward to Dakota. The tree is found in more than half of the area of the United States; and if some closely related species are included, it is found in practically the whole country. But pencils are made only of trees which grow in the southern states, for the wood of the same tree growing farther north or west is not regarded suitable for pencils. It is too hard, or in some other particular the manufacturers find it objectionable. Therefore, the best cedar for pencils is restricted to regions somewhat limited, although woods other than this cedar are put to some use in many regions and countries, though not one of them is regarded as a rival of this cedar.

Heartwood is liked best, and first-class heartwood is apt to be found in cedars of large size. It must be of good color and of soft texture, free from flinty streaks. Cheap pencils may be made of inferior wood, or of softwood dyed to imitate heart; but the best pencils are of heartwood. The demands of custom and fashion are somewhat exacting. The most insistent demand of custom is that the wood of a good pencil shall have a delicate cedar odor. The writing qualities of the pencil are not improved or lessened by the odor or lack of odor of the pencil wood; nevertheless, custom insists that the odor must be present. Many persons associate odor with fine quality in a pencil. If the odor is lacking or if it is unsatisfactory, they conclude that the pencil's quality is lacking. Purchasers often smell a pencil before buying, and if they are not satisfied with the odor, they refuse to buy that particular pencil.

It is thus apparent that wood's smell has much to do with the sale of any particular brand of lead pencil, and the manufacturer takes that fact into consideration. It so happens that the odor of southern red cedar is strong and characteristic, and it has influenced the popularity of that wood as pencil stock. It has desirable qualities other than its odor. Its color has already been mentioned, but that quality should be further emphasized. A pencil of pale, nearly colorless wood is not liked, though such a pencil might write as well as any other. It looks cheap and many persons judge pencils by their appearance.

Cedar's light weight is a quality appreciated by manufacturers of pencils. Wholesale shipping is done in large quantities, and the shipment pays freight in accordance with its weight. The weight of a thousand gross of pencils of cedar is much less than it would be if the shipment were made up of pencils of some heavy wood. It is, therefore, proper to regard light weight in pencil wood as a property calculated to enhance its value.

Still another quality is insisted upon by most pencil users whose tastes and prejudices have been developed. They want a pencil that whittles nicely and easily. That seems like a trifling consideration, but it has its weight in determining what woods make the best pencils. Of course, the wood must be soft if it is to cut easily. Further than that, it must cut without a gritty sensation. The wood must crumble away from the knife blade while the pencil is in the process of being sharpened. Tough shavings which curl and roll like sliced horn condemn a pencil in popular opinion. Persons who are particular



DRAWING INSTRUMENTS

Drawing tools and instruments call for fine woods, some of foreign origin, other native of this country. Boxwood, mahogany and ebony are the chief imported woods, while our own forests furnish cherry, walnut, maple, beech and poplar. Some instruments of this kind are wholly of wood, others only in part.

in their choice of something to whittle, are not unreasonable in this demand for a soft, brittle wood. Most men enjoy whittling, and if the pencil does not cut in a pleasing manner, they feel that a cheap, inferior article has been foisted on them, and when they buy another pencil, they will choose another brand. When they finally try out a make that cuts smoothly, has a pleasing smell and a good color, they buy that brand in the future. Pencil makers are aware how much their sales depend on fad, fashion and prejudice, and they study the art of pleasing. At the same time cheap and inferior pencils are thrown on the market to be bought by Tom, Dick and Harry, who have no taste and little discrimination and will buy any sort of pencil that makes a mark.

Pencils have been made without wood. The rod of graphite is encased in paper. The claim is made and is duly advertised that such pencils can be sharpened without the use of a knife or other machine, by simply unwrapping some of the paper. Perhaps the fact is not so extensively advertised as it once was because it has been ascertained that people do not as a general thing object to whittling a pencil when they want a point on it. If the rod of graphite in a paper pencil is of good quality, the pencil should write as well as one with wooden stock; yet any one who will observe the pencil user in business will quickly see that the paper article which needs no whittling, and has no odor or color, is not very popular.

The fact that wood has so much to do with the success and popularity of a lead pencil, makes it easy to understand why the search for suitable stock has been so thorough. By pretty general consent, the best pencil cedar is admitted to grow in certain regions only, say from Virginia southward. That does not imply that some good cedar does not grow elsewhere, but the largest supply of the best comes from very limited regions, particularly from Tennessee. Information long ago became public that pencil makers were buying old fences of cedar rails, barns, cabins, bridges, cribs and other old cedar structures in Tennessee, as well as such standing timber as was to be had.

THE SOUTHERN PENCIL CEDAR

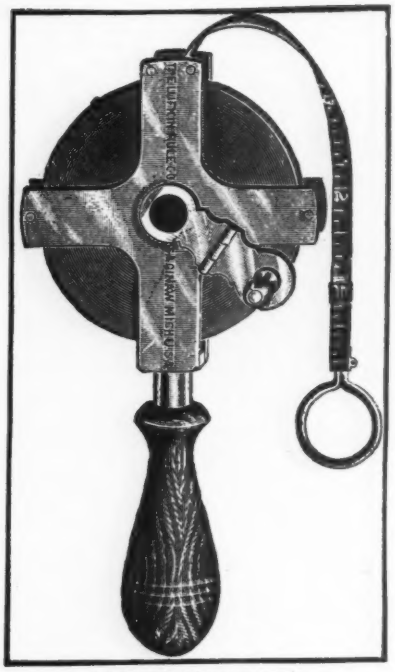
Here is shown a fully matured red cedar from North Carolina, the kind of which lead pencils are made. Few of the pencil cedars of that size and age remain standing, though they were once abundant.

The soil and climate of Tennessee happen to be just right to produce large cedar trees, and the best wood comes from such. But small trunks which are knotty and fluted do not offer much encouragement to the pencil manufacturer. Perhaps a larger number of cedar trees are now standing in Texas than ever stood in Tennessee, yet little pencil stock ever comes out of Texas. The trees are usually too small, knotty, and with too little red heart.

Southern red cedar is not the sole pencil wood to be had in this country. In Florida some of the best stock is cut from a species closely related and called juniper or Barbadoes juniper (*Juniperus barbadensis*). It has been pronounced to be the equal of the regular pencil cedar; but it is scarce, and is found in certain restricted localities only. Between the Rocky Mountains and the Pacific Coast are several cedars closely related to that of which pencils are made, and their wood is believed to be in every way suitable for pencils, but not much of it is to be had. Trees are scarce and scattered, and most of them are of poor form and small size.

The incense cedar of California has met considerable use as pencil wood in recent years, though the claim has not been made that it is in all respects equal to the southern red cedar. In one particular it measures with or above the southern tree, that is, the trunk is larger and contains more clear heartwood, notwithstanding the white sapwood is relatively thick. The tree has been called incense cedar, but the name is not due to the smell of the wood, but to the odor of foliage and green twigs.

Pencil makers must handle much wood that is not high class, notably the sapwood and the billets which contain flinty streaks. Such material is usually thrown out in selecting pencil stock. It may be dyed and then made into cheap pencils, or it may be manufactured into



MEASURING TAPES

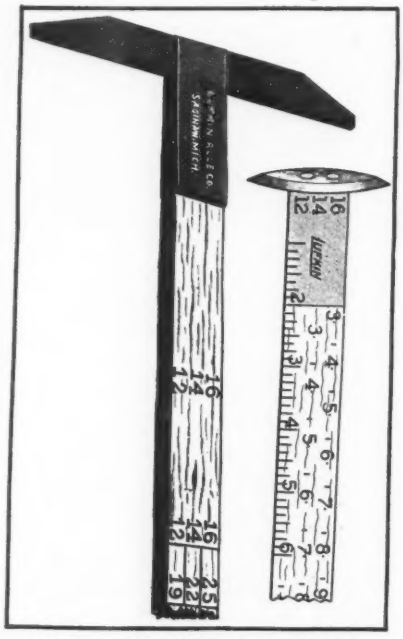
These measuring tapes are used by surveyors when they desire to make accurate measurements. The whole instrument is metal except the handle, but that is an important part and is of wood. The hand retains a firmer and easier grip on wood than on metal, and for that reason the wooden handle is preferred.

pen holders. The latter article does not demand a colored wood, or one that whittles nicely. It is thus practicable to utilize rejects from the pencil factory in making other articles. Pen holders are made of many woods other than cedar, and they are so well covered with paint and varnish that the user may never know the kind of wood. A pretty large percentage of penholders are pine; some are yellow poplar, basswood, tupelo, and other common woods.

It was once a custom, though it was perhaps not the general custom, for pencil manufacturers to soak thoroughly their cedar logs in ponds and rivers and leave them there exposed till their sapwood had disappeared by decay. That was easy to do because the sapwood is so susceptible to decay and the heartwood so resistant that the former disappears long before the heart has even been affected by rot. Three or four years, under favorable conditions, suffice to rot away the sapwood. While that is taking place, the heart becomes mellow and brittle, precisely the condition desired by the pencil maker.

Less rotting is purposely done now than formerly, because the white sapwood is put to use for pen holders and cheap pencils. Deliberate waste is no longer popular, even the waste of a thing as cheap as cedar sapwood.

Wood intended for lead pencils passes through several processes or operations. The trees are cut down and the logs are sawed off the same as any other logging operation. The

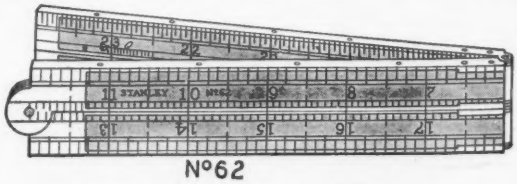


RULES FOR LOG AND BOARD MEASURE

The upper cut in the accompanying illustration represents a board rule, while the lower is designed for measuring the contents of logs. Both are of wood and in most instances are made of hickory. They are made in different patterns to meet various needs and to conform to different tastes.

logs may be sent directly to the factory which carries out all the work till the finished pencil is ready to pack for sale; but generally the commodity known as a pencil slat is a product intermediate between the log and the completed pencil. The slat is the product of a special mill. It is a thin board about seven inches long and of a thickness equal to half the diameter of a lead pencil, and wide enough for six pencils side by side. The slat is passed through a machine which shapes each half pencil and cuts a groove for the graphite. In that state of manufacture the slats are shipped to the factory that inserts the graphite, glues together the two longitudinal halves, polishes, prints, and boxes the pencils, and they are ready to ship.

It is worth remark that though the product is called a lead pencil, it contains not a particle of lead. The name simply conforms to the popular belief that the marking substance is lead. Real lead pencils were formerly made. The process consisted in pouring melted lead into a goose quill, or into the pith cavity of some small weed or reed, and thus make a pencil that would leave a black mark on white paper. It was expected of the old-time pedagogue, as a part of his educational attainments, that he should be able to make lead pencils for his pupils who were far enough advanced to need them. The process of making was simple, but a little dangerous. The quill that was to receive the lead was stuck upright in a potato or a turnip while the pedagogue poured in the molten lead from a ladle or an iron spoon. Usually all went well; but sometimes when the hot lead came in contact with the wet pulp of the vegetable, a resulting flash of steam threw the molten metal in every direction, and the eyes, hands and faces of teacher and pupils were in danger of severe burning. The quantity of hot lead was usually so small that no serious damage resulted; but if such operations were attempted in schoolrooms today, the National Safety Council would likely get busy immediately and require the



BOXWOOD MEASURING RULE

Boxwood is better than ivory in the manufacture of measuring rules because the wood is less susceptible to weather changes than is the ivory. Therefore, wooden rules fill more exacting places than those of more expensive material. (Photograph by courtesy of the Stanley Tool and Level Company, New Britain, Connecticut.)

THE SOURCE OF CHERRY LUMBER

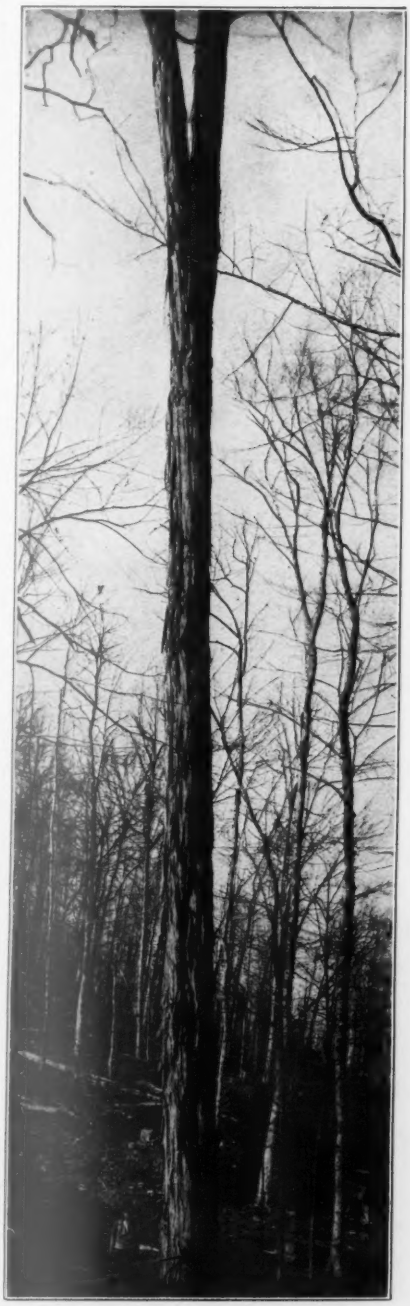
Many of the best professional and scientific instruments are made of cherry. This wood has become scarce and the price is high. The accompanying picture shows four fine wild cherry trunks on one of the ranges of the southern Appalachian mountains. It is a tree of slow growth and of solitary habits.

teacher to manufacture the pencils outside of school hours. The name "lead pencil" is all that has survived from the old custom.

The lead pencil is only one of several items included in the professional and scientific instrument industry. Other items are rulers, squares, spirit levels, thermometers, cameras, tripods and various drafting instruments. Many other articles are included, but the line which separates them from the industry known as "novelties" is not definitely fixed. Some persons might class a certain article as a novelty while others would consider it a professional or scientific instrument. The thermometer is an example of an article of doubtful class. The glass tubes and the graduated scales belonging to thermometers are often mounted on boards or wooden frames. If the thermometer is high-class, it is clearly a scientific instrument; but if it is cheap and is primarily intended for advertising purposes, as many such thermometers are, it ought to belong with novelties. The same holds true of rulers. If carefully planned and well made, they are in the scientific instrument class; but if cheap, and intended to contain printing or stenciling to display advertisements they do not properly belong to scientific instruments. The list of woods which follows contains woods of various kinds, and they meet various uses.

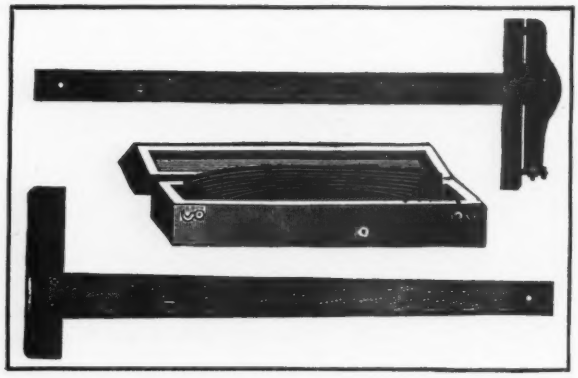
Kind of Wood	*Feet per Year*
Cedar	20,050,000
Maple	4,425,167
Basswood	2,619,070
Beech	1,259,600
Birch	1,062,050
Yellow poplar	1,001,400
Hickory	971,332
Cherry	732,750
West India boxwood	653,848
White pine	601,670
Oak	372,100
Chestnut	367,000
Rosewood	219,353
Ash	123,600
Mahogany	82,862
Red gum	75,000
Black walnut	71,200
Cocobola	64,800
Yellow pine	46,600
Lignum-vitae	37,236
Redwood	31,220
Dogwood	31,200
Butternut	30,000
Douglas fir	30,000
Applewood	25,000
Sugar pine	23,500
Cypress	23,000
Spruce	16,000
Tupelo	12,000
Western yellow pine	8,000
Teak	1,000
Ebony	500
Elm	200
Cottonwood	170
Total	35,070,928

The most satisfactory test for determining whether a kind of article should be considered as a novelty or as something better, is based on cost and quality. Novelties are cheap; instruments are expensive. A division of that kind cannot be made according to the quality of the woods used,



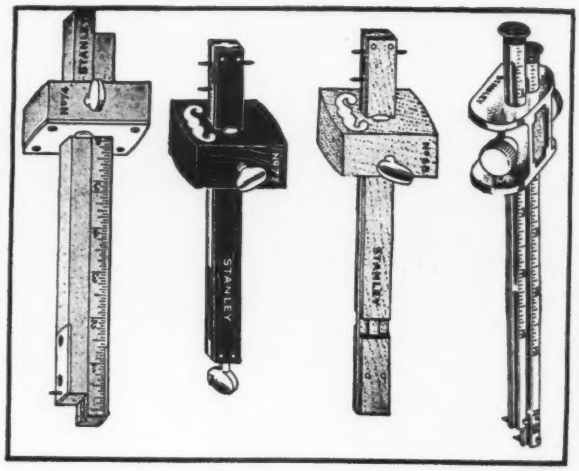
TOUGH, STRONG RESILIENT

Hickory is indispensable in the manufacture of many professional and scientific instruments, particularly where toughness is required, as in the making of lumbermen's measuring rules.



RAILROAD CURVES AND T-SQUARES

T-squares are often of mahogany and cherry, or of black or Circassian walnut, though other woods which season nicely may be used. The railroad curves shown in the picture are made of pear wood. Experience has shown this to be an excellent wood for this instrument and it is preferred before most others.



SMALL WOODEN GAUGES

A class of gauges which are alike in their main features but different in minor particulars and details. The finest are of boxwood or ebony, but the common sorts are quite satisfactory if of beech, hickory, maple, hornbeam or mahogany.

because a few fine woods are made into rather cheap articles, and some woods which are common enough may form parts of fine instruments.

Seven of these woods are foreign, the others native of the United States. The foreign woods and the principal countries of origin are here given:

West Indies, boxwood (*Tabeuia pentaphylla*) is hard, strong, of a yellow color, and has a fine, smooth grain. The wood is obtained in the West Indies, Panama, Brazil and adjacent regions. It is known under various names in different countries, among such being zapatero, white cedar, cogwood and whitewood. It

WOODEN TRIPODS

The tripod is in general use for mounting scientific instruments which require a firm base and need to be moved frequently from place to place. The illustration herewith shows a telescope on its tripod, and another style of mounting is shown, such as commonly forms part of the surveyor's transit. Maple is most used for this purpose.

is nearly as hard as Turkish boxwood and one of the most acceptable substitutes for it for many purposes. It is liable to split open during the process of seasoning, and for that reason it is difficult to season. This tree seldom developes heartwood that is distinguishable from the sap by its color. The largest use is in the manufacture of fine rulers. It does not go much into cheap articles where less valuable woods will answer. It is particularly valuable for rulers because its hardness and fine grain

INCENSE CEDAR FOR LEAD PENCILS

This splendid cedar from the Sierra Nevada Mountains is now being substituted for the southern red cedar in the manufacture of lead pencils. It is a much larger tree than the southern cedar, but it is wanting in odor, the wood is not so red nor is it so soft as that of the southern tree.

facilitate the marking of very fine lines on the measuring scale, at least as small as the sixty-fourth of an inch. It is one of the straightest-grained woods in the world, and that gives it additional value as material for the manufacture of rulers. Turkish boxwood is now so scarce and expensive that very little of it comes on the market. being manufactured into rulers in this country, and its place has been largely taken by the West Indies species.

The name rosewod is often heard, but the same species is not always meant. Several trees of the genus Dalbergia, but of different species, are included in the term. They come from widely separated countries, among them being Africa, South America, Asia and Central America. A large part of the rosewood used in the United States Statistics do not show that a single foot of it is now of a species from Africa (*Dalbergia Melanoxylon*). This comes from Brazil, but considerable use has been reported is best known as African blackwood or African grendilla. The Brazil wood is *Dalbergia nigra.* All the rosewoods belong to the same order of trees as our locust. The color is usually black or purple. The name is not bestowed on this wood because of the color, as might be supposed, but on account of the delicate odor of the freshly-cut wood. The odor does not persist long, for it soon ceases to attract. The wood is named for its odor, but is valued for its color and fine grain. It is heavy. Perfectly seasoned specimens may sink in water. It

THE WOODEN SPIRIT LEVEL

This instrument is used to plumb walls and posts and to determine whether foundations and floors are horizontal. Various forms and patterns are in use, but wood is one of the most satisfactory materials that can be used. (Photograph by courtesy of the Stanley Tool and Level Company, New Britain, Connecticut.)

varies much in hardness and may equal ebony. Its principal uses in the professional and scientific instrument industry are for T-squares, spirit levels, cameras and drafting instruments.

Several different woods are bought and sold under the name mahogany. They come from different parts of the world, and some of them are in one family of trees and some in another. If strict botanical definitions are insisted upon, the name could be applied only to the mahogany grown in tropical America; but woods of Africa,

THE DRAWING TABLE

The table here shown has a metal stand, but many have wood. The top, which is the main part of the table, is always of wood, and it is hinged so that it may be tilted and inclined in any way that the operator may wish. The top of the table is generally of basswood or white pine, which are so soft that thumb tacks will sink into them easily.

WOOD FOR THERMOMETER BACKS

The glass tube of a thermometer will be broken if fastened to a wood that warps, so the better grade of thermometers have backs of walnut, cherry or mahogany, as they show little tendency to warp. These logs are black walnut.

India, Australia and the Philippines pass as mahogany, without too close insistence on botanical distinctions. Mahogany is little disposed to warp, shrink, or swell, and that characteristic makes it of special value for instruments which must retain their shapes under climatic changes. The makers of cameras employ a large quantity of mahogany, and it is liked for T-squares, and for numerous other small articles.

The uses of cocobola, lignum-vitae, teak and ebony are less extensive, and although these foreign woods are serviceable and handsome they cannot be considered very important in this industry because not used in large quantities.

The T-square is so called from its shape. It is used by draftsmen and mechanics in establishing perpendiculars. In making this instrument, a wood is wanted which is not liable to warp, and the best are mahogany and walnut, though a number of other hard and dense woods are employed. This square is often of large size, and it cannot well be made of steel because that metal is too heavy. Wood holds first place.

A large bill of lumber goes into thermometers; but most of these are of ordinary woods, such as yellow poplar, basswood, tupelo and pine. Thermometers may be only a few inches long, or they may be three or four feet, and in the aggregate they call for a rather large amount of wood.

By some unwritten law or widely respected custom, the spirit level is supposed to be made of cherry, though many are not, some being mahogany, walnut and other woods that hold their shape well after having been seasoned. It is a tool employed by builders in plumbing walls and leveling foundations and sills. Wood is rated superior to metal for large spirit levels because weight must be held within reasonable limits. Other advantages are claimed for wood, the chief of them being that this material is almost entirely free from tendency to become distorted under the influence of heat and cold.

Wood's superiority to other available materials for cameras is unquestioned. Its light weight alone gives it an advantage. The wooden portion of the camera is a box which contains the plates or films and the lenses.

Several woods serve for tripods for cameras, kodaks, and surveying instruments. Among the best are birch, maple, walnut, mahogany, rosewood and ebony.

BIRD GUARDIANS OF THE TREES

By Edward Howe Forbush

Massachusetts State Ornithologist

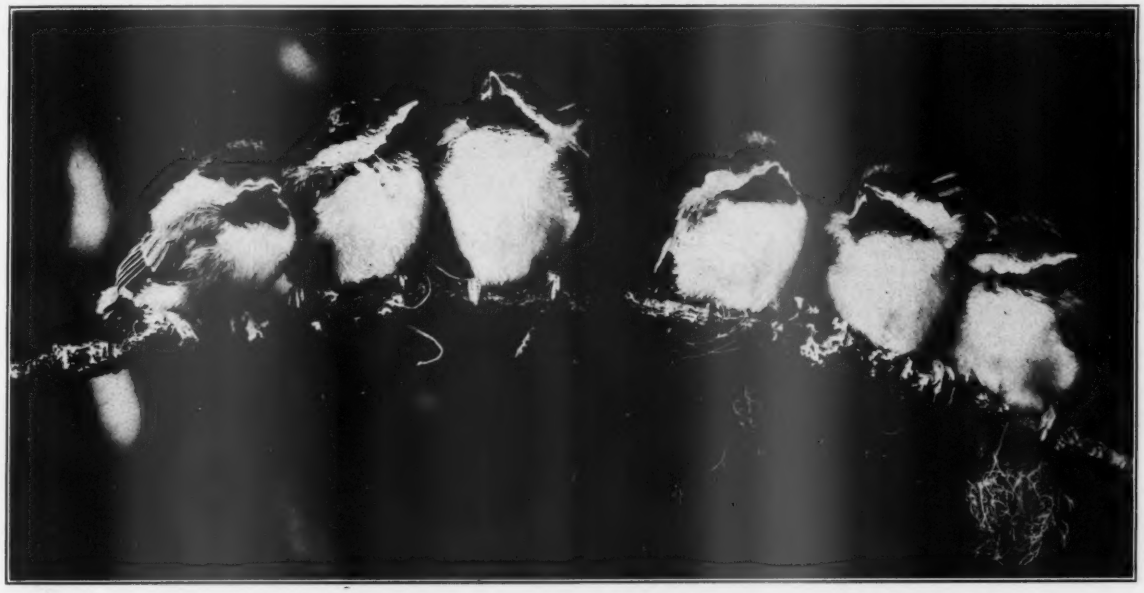
IN studying the economic relations of birds to man and other forms of life, this question is most important: What do birds do in the world? As we investigate their activities from our viewpoint, we find few birds altogether useful to man. Many are harmless and some harmful, but the vast majority of birds which come in close contact with man and his property benefit him far more than they injure him. In primeval nature all birds are beneficial.

The well-being of each form of life depends more or less on the welfare of other organisms. Take the relations of the bird and the tree. In the battle of life birds and trees are interdependent. Trees furnish buds, blossoms, fruit and seeds which birds use for food. Trees support many insects that are eaten by birds; also, they provide birds with hiding places in hollow trunk and limb, excellent nesting places and leafy shelter from sun and storm. Birds, on their part, protect trees by eating the surplus insect enemies of trees, thus preventing undue increase of these enemies. Humming birds like bees fertilize tree blossoms, and many birds distribute and plant tree seeds. Bartram believed that Jays alone would soon replant all cleared lands were it not for the implements of soil cultivation.

The possibilities of the increase of forest insects are so appalling that potent forces to keep them within bounds are indispensable; otherwise. insects might destroy all forest trees. The numbers of insect species that attack a single tree sometimes run into hundreds, and the individuals of each species if unchecked would soon number untold millions. Before such countless hordes man would be powerless. We can spray orchards and shade trees with poisonous insecticides, but we would stand aghast at the impossible task of spraying all the trees in all the woods. We must perforce depend on the natural enemies of insects to protect our forests. Fortunately, birds and other foes of insects, wherever their numbers are sufficient, act as effective forest guardians.

Professor F. E. L. Beal, whose experience in studying the food of birds was greater than that of any man now living, believed that birds were an effective check upon the increase of insects, and that it was doubtful if anywhere else in the animal kingdom "any other restraining influence so important" could be found.

The normal reaction of birds upon the insect enemies of trees is that of annual and perennial repression. All through the winter months our forests are searched, tree after tree, by Nuthatches, Titmouses, Creepers, Kinglets and Woodpeckers for eggs and other hibernating forms of insects. As spring advances, as buds open, as tiny caterpillars and grubs emerge from the egg, come the hosts of arboreal birds—Sparrows, Thrushes, Warblers and others—sweeping through the woods in migration. Under normal conditions they destroy something like ninety per cent of the tiny caterpillars hatching upon the external parts of trees before these caterpillars become



Photograph by Cordelia J. Stanwood.

CHICKADEES JUST FROM THE NEST

They destroy spruce moths and many other forest pests. These youngsters appear to be deliberately posing for an effective picture.

Photograph by Cordelia J. Stanwood.

LITTLE TREE DOCTORS

Hairy woodpeckers just from the nest. They seem possessed with a mania for destroying forest insects and larvae and are indispensable to the scheme of forest protection.

large enough to attract our notice. Then come the breeding birds, searching the trees all summer for food for their insatiable young, and with autumn comes another immense migration of hungry birds, penetrating all the forests and searching for what the summer birds have left.

Thus is exerted the regular repressive influence of birds upon the enemies of trees, and if there are birds enough, and all the other forces of repression work in harmony, insect pests do no appreciable injury, the trees flourish and the forest remains in full leafage and fruitage.

Too well, however, we know that this is not everywhere and always the case. There are pests introduced from foreign shores that seem to be invincible. There are local outbreaks of native pests that the birds seem powerless ot check, and sometimes these irruptions assume alarming proportions. Such infestations, however, may often be traced to a prior scarcity of birds, and when such invasions occur, they are almost certain to be followed by an increase of birds drawn from the surrounding country. Such augmentation of the feathered tribes often has been known to check a great invasion of insects, for it is one of the functions of birds to gather swiftly from far and near, like winged policemen of the air, to quell such disturbances.

How a scarcity of birds may result in the destruction of forests is told by Wilson Flagg in the annual report of the Massachusetts State Board of Agriculture for 1865. In 1798 the forests in Saxony and Brandenburg were attacked by lepidopterous borers that killed the trees. The calamity became so general that expert foresters and naturalists were employed by the regency to inquire into its cause. They reported that the unusual and extraordinary increase of these insects was due to the absence from the forests for several years of certain Woodpeckers and Titmouses.

An increase of birds is followed always by a decrease of insects on which they feed.

Mr. B. A. Arnold told me that in the summer of 1913 a spruce moth became so abundant on parts of Mt. Desert Island that the people began to fear the total destruction of the spruce woods. He had noticed that numerous red squirrels were destroying eggs and young birds, and therefore on his own estate, situated on a peninsula, almost an island, he had shot all the squirrels. As a result of this the birds on his place increased largely. In a short time the trees were cleared of both caterpillars and moths by the birds, which fed them to their young; while on the mainland, where squirrels were still numerous and birds were few, the devastation of the trees continued.

Woodpeckers are indispensable in the forest. Old "Mr. Peckerwood" is a tree doctor. He performs surgical

Photograph by Cordelia J. Stanwood.

YOUNG FLICKER EXPLORING ITS FIRST TREE

It will be relentless in its search for the enemy and merciless when the enemy is found.

operations that save the trees. When the leopard moth was introduced into this country from Europe, it seemed at first as if it were destined to destroy all our trees, but as time went on, we found thtt it killed no trees except in and near the cities, where the ubiquitous English Sparrow had largely driven out other birds; in the country, where native birds were numerous, the ravages of this moth soon were checked. In city after city its wood-boring larvae killed first the smaller branches, then the larger ones, and finally many trees died from its attacks. Many ancient trees in historic parks, like Boston Common and the grounds of Harvard University in Cambridge, have been cut down or rooted out because of this and other tree pests, but in the rural districts the larvae of the leopard moth now do little injury, and in the woods they are hard to find. Woodpeckers search for them, dig into their holes, drag them out and wax fat upon such sustenance. The Downy Woodpecker, the Hairy Woodpecker and the Flicker all seem possessed with a mania for killing these and many other destructive wood-boring larvae. Better equipped than a telegraph lineman for climbing; supported by a spurred tail; provided with hooked claws for clinging to the bark; hammer-headed, chisel-beaked, and armed with a tremendously long, strong, lance-pointed, barbed, extensile tongue, the

Photograph by Cordelia J. Stanwood.

THE GREAT HORNED OWL

This bird protects young trees by killing mice and rabbits. It is a premium ratter.

Photograph by C. W. Leister

A FAMILY OF CHESTNUT-SIDED WARBLERS

They feed on insects that injure woodland trees, and so perform a real service for humankind.

Woodpecker drills through the wood directly into the spot where the borer lies hidden, pushes in the tip of his barbed tongue, spears the victim and whips it quickly into his open beak. The wonder of it all is that "Dr. Peckerwood" knows just where to operate. He needs no X-ray of stethoscope to determine the seat of the trouble. In summer he may hear the borer working in the wood, but in winter, when both insects and trees are frozen, when there is no possibility of any sound to guide him, the tree doctor always operates just where the hibernating, motionless insects lie snugly hidden in their cells. We can only surmise that he locates them by tapping with his bill, and that his auditory nerves are so sensitive to the slight differences in sound vibration that he knows exactly where to drive his tunnel. In any case, be the enemy a few wood-boring ants collected at different points along their channels, or the larvae of moth or beetle, the little tree-surgeon unhesitatingly drills right to the spot. Cocoons hidden under the bark are pierced in the same way. It is as if the eye of the Woodpecker could see through bark and wood, and his perseverance in digging out the enemy never fails. Even the Sapsucker, execrated as he is for destroying or disfiguring certain trees, is of some service. In the year 1911 a bark beetle had attacked the pine forests of the coast region of South Carolina and many trees were destroyed. In the autumn large numbers of Yellow-bellied Sapsuckers came down from their northern homes and worked upon the pines attacked by these beetles. In the autumn of 1912 I examined many of these trees. Those that had been worked by the Sapsucker had recovered, while those that it had not drilled were dead or dying. The bark of the healthy trees showed many scars where the Sapsuckers had drilled through to reach the beetles.

Insects are by no means the only enemies of the trees

that must be held in subjection for the good of the forest. No doubt squirrels, rabbits, mice, rats and some other rodents when in small numbers may be beneficial or at least not injurious to the forest, as both squirrels and mice are natural tree planters, but if any of these rodents become too numerous, they immediately become destructive to the trees. Squirrels, rats and climbing mice reduce the friendly birds by destroying their eggs and young. Also, squirrels and mice, if too abundant, eat practically all the tree seeds, leaving almost none for propagation. Mice and rabbits kill young trees by gnawing off the bark in winter, thus girdling them. Therefore, hawks, owls and other predatory birds that kill rodents and so tend to hold their numbers down perform an inestimable service in the forest. Most of these birds nest in the woods, and although they hunt much for field mice in the open, they feed also on squirrels, wood mice and rabbits. They kill some birds, but as compensation for this they protect birds by destroying their enemies—skunks, weasels, mice, squirrels, etc. Squirrels become tree planters largely through the agency of hawks and owls. The squirrel buries nuts, acorns and other tree seeds in the leaf mould on the forest floor that he may unearth his treasures in the lean days of late winter and early spring. A squirrel killed in winter by hawk or owl has planted a hickory wood or a lot of pine and other trees for all creation. The Broad-winged Hawk and the Great Horned Owl shown in our illustrations are useful as forest birds, although this particular owl is an enemy of game birds. Most of the hawks and owls feed much more upon destructive insects and rodents than upon birds or game.

The Great Horned Owl, a typical woodland bird, is perhaps the most powerful of them all, only inferior in strength and fierceness to the eagle. Ponderously muscled, its great talons contract by means of powerful tendons which slide easily through grooves in the tarsal bones and draw over the bended joints so that the full weight and strength of the bird sends them through the shrinking vitals of its prey. Its face appears satanic with its horn-like crests, cruel beak and great glaring, yellow eyes. Its wierd voice when heard in the stillness of the night strikes terror not only into the breasts of the timid ones on which it preys, but often into human souls as well. Primitive people regard it as the very personification of Satan, and name it "The Evil One." It is said that certain tribes in the West were so superstitious regarding this bird that they believed that if one alighted o nthe roof of a man's lodge, that man was doomed to die, and such was the grip of this belief upon them that the doomed man actually pined away and died —that is, if he saw the bird alight on his domicile. Ordinarily the call of this owl is a deep booming *whoo hoo! hoo-whoo! hoo-whoo!* varying somewhat in order of syllables and depth of tone with different performers, but it has a great variety of wild cries, among them a high, startling, clearly enunciated *wa 'hoo* or *waugh 'hoo,* the first syllable with a rising or interrogative inflection, the second a falling note, but often followed by a variety of others, thus *waugh ooo oo oo oo oo-ooh,* or *waugh oo ooo ooo oooh oo oo ooo,* or *wu wu wu wu waugh waugh.* This owl has a piercing scream or yell, also a long series of gabbling notes. I well remember one evening, sitting alone in William Brewster's cabin in the Concord woods and hearing many strange sounds which I attributed at first to a child trying to imitate a baying hound, but as the sounds came nearer they were recognized as notes of the Great Horned Owl, and for some time that owl and I held quite a conversation by moonlight. The owl, however, would never shine in society

FLEDGLING MAGNOLIA WARBLERS Photograph by Cordelia J. Stanwood.

Fed by their parents on forest insects, they will thrive and wax fat and eventually fill their places in the protective army of beautiful birds guarding our forests.

Photograph by Cordelia J. Stanwood.

YOUNG BROAD-WINGED HAWK

This baby belongs to a valuable economic family, for the Hawks feed on mice that destroy young trees.

by reason of its conversational powers, as its remarks are much more forcible than elegant, and it frequently carries about in its plumage the penetrating effluvium of the "woods pussy." Many skunks are slain by this dark demon of the night.

The plumage of the owl is so enveloped in fine and downy filaments that its flight is noiseless. It takes its victims unawares and therefore is able to overcome animals much larger and heavier than itself.

One night a farmer near Worcester, Massachusetts, heard an agonized squall from a big tomcat which had been promenading in front of the house in the moonlight. From the open door the cat could be seen in the grasp of an owl, and before the farmer could secure his loaded gun and shoot the bird, poor Tom had yielded up his nine lives. The powerful owl had struck him noiselessly from behind and had quickly ripped out his vitals. If any of his lives were left when the shotgun came on the scene, that finished him. The farmer suggested that the owl seemed to be taking that cat apart, as the farm boy once took apart an alarm clock, "to see how it went."

One of my own experiences will serve to illustrate the owl's noiseless approach. One autumn evening I stepped out of my little camp in the Wareham woods to take some exercise before bed-time. It was a clear, lovely night, with a full moon riding up a cloudless sky; not a breath of air stirred the plumes of the tall white pines about me, which were softened and etherealized by the pale moon's light. I had begun stretching and swaying the muscles of my neck and torso when a loud cry, half shriek, half laugh, sounded from the air within a few feet of my head, followed by a jumbled medley of strange sounds, profanely expressive of astonishment and disgust, which passed by me swiftly and away toward the meadow. Startled, I turned to see, but nothing saw. Without a sound of quill or plume a Great Horned Owl had passed close by my head, and so fast it clove the air that it was out of sight in the moonlight before my eye could find and follow its vanishing shape. One might have imagined it the disembodied voice of an evil spirit passing swiftly through the moonlit woods. I had been wearing a white hat and the owl had been sitting in the top of some tall pine. As his keen eye glanced over and past the roof of my cabin, he perceived that moving white object. He had swept down to strike, and had discovered his mistake only when he had passed over the roof and saw what was under that hat. Look before you leap—is a wise maxim for owls and men. Very

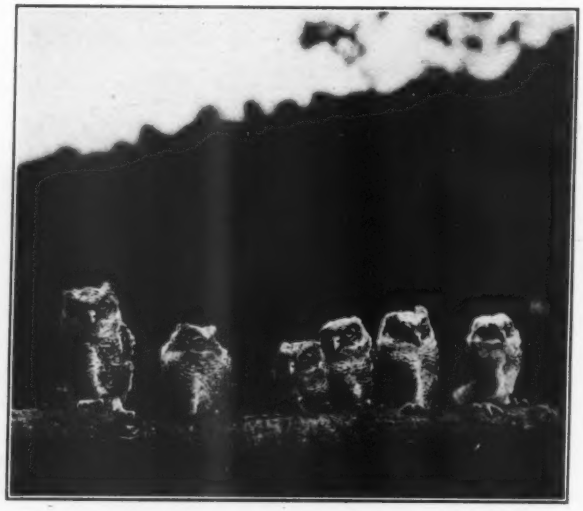
Photograph by Cordelia J. Stanwood.

A RAPID GROWER

The same Broad-winged Hawk taken two weeks later, showing how quickly the plumage grows and the bird matures.

likely in the distance he mistook the hat for a white pullet or a rabbit. To a superstitious person not knowing the source of such sounds the incident might have been disquieting.

The Horned Owl slays rabbits, rats and mice by wholesale. Dr. A. K. Fisher in his bulletin on the Hawks and Owls of the United States, quotes Mr. O. E. Niles, who found the remains of 113 dead rats at one time on the ground below a Great Horned Owl's nest. This bird is the chief enemy of the common crow and we should not have so many crows if owls were not shot indiscriminately.



Photograph by C. W. Leister.

SOME WOODLAND MOUSERS

The younger members of a screech-owl family. Note the Hebraic aspect of their countenances. When the sun sets their day begins.

As the hunter, woodchopper and settler subdue the wilderness, the hoot of the Horned Owl is heard less and less in the woods, until at last all the owls of this species breeding in settled regions are wiped out. This is what has happened now in a large part of the eastern United States. Now and then in some winters, when food is scarce in the north, Northern Owls may drift here in migration; otherwise the Horned Owl is a disappearing bird. In the forests he may survive, but otherwise the land that knew him of old shall know him no more.

BOY SCOUTS ADOPT A TREE

THE TREE THE BOYS ADOPTED

This unusual tree is a native prone juniper near the Masonic Homes at Elizabethtown, Pennsylvania. It is at least 80 years old, and now measures 48 feet in diameter, and is 24 inches high. The limbs lying on the ground do not take root. It has been successfully propagated at the Masonic Homes by cuttings, and a large number of young trees are now being developed there. The Boy Scouts of Elizabethtown have adopted this remarkable tree, and have protected it from vandals by erecting a substantial fence around it. It is prefectly hardy and free from blight. The foliage is of a deeper blue-green than tint ordinary trees of the same family. The picture was sent AMERICAN FORESTRY by the Hon. George B. Orlady, presiding judge of the Superior Court of Pennsylvania.

EDITORIAL

OPPOSITION TO TRANSFER OF NATIONAL FORESTS

A STEADY barrage of resolutions opposing the proposed transfer of the National Forests in the United States and in Alaska from the Department of Agriculture to the Department of the Interior has had its effect in preventing any further advance of this measure in Congress. Senators and Representatives from all sections of the country have received these resolutions from civic and other organizations as well as protests from individuals. Both resolutions and protests have been vigorous and of the character which compel attention. Apparently those who support the measure have been surprised by the rapidly spreading and wide-spread opposition to it, while those who oppose it have been cheered, not only by the protests, but also by the statement of President Harding in his speech before the National Agricultural Congress in which he emphasized the close relationship between forestry and agriculture. This relationship is one of the best arguments in favor of allowing the National Forests to remain under the jurisdiction of the Department of Agriculture.

The forcefulness of the resolutions is noticeable. The Pennsylvania State Forest Commission declares the proposed transfer to be "unnecessary, unjustified and dangerous to the cause of forestry in Pennsylvania and the nation," and adds that "it would ruin the Forest Service." The Penobscot (Me.) Forestry Club says "it would be contrary to the public interests." The Asheville (N. C.) Chamber of Commerce declares that as the forest is a product of the soil "the extraordinary progress made in the protection of our forests would be immensely retarded and the whole forestry program set backward, we believe, by changing the administration of forestry affairs from the Agricultural Department to the Department of the Interior." The California State Board of Forestry, speaking for the forestry interests of that state, "records its emphatic disapproval of such transfer," while the Pueblo, Colorado, Commerce Club sends out the resolutions of the San Isabel Public Recreation Association, in which it concurs and which declared that "this organization vigorously protests against any change and earnestly requests our representatives in Congress to oppose any transfer of the National Forests." The Rye Recreation and Progressive Association, of Rye, Colorado, states "our relations with the Forest Service proves to us that their methods of administering the forests are to the best interests of all concerned" and voices its protest also. The Maine Forestry Association "feels that the proposed transfer would be a severe blow to the present high efficiency of the Forest Service and would inevitably result in a loss of ground previously gained in the struggle for intelligent forest conservation" and opposes the transfer; and the North Carolina Forestry Association declares "we strongly condemn the movement to transfer some or all of the activities of the Forest Service from the United States Department of Agriculture, where it has been most efficiently administered during the past fifteen years, to the Department of the Interior."

The California Forest Protective Association, composed of timberland owners, voices its protest in no uncertain words by saying "such transfer would not be effective as to economy or unity of organization, and would very probably result in destructive changes in the work of the Forest Service and the administration of the National Forests."

These quoted are only a few of the expressions of opinion from influential organizations, but they express the character of all of the protests which have been made and those which are to be made—protests which Congress cannot possibly ignore—and which will undoubtedly make a decided impression upon the representatives of the people.

OPERATION OF THE WEEKS LAW THREATENED

PUBLIC interests are seriously threatened by failure of the Bureau of the Budget to make adequate provision for the operation of the Weeks Law after June 30 of this year. Since 1911 the Government has been gradually acquiring land under this law because Congress has recognized the importance of the work and has made available the moderate appropriations necessary to carry out the original plan. This plan contemplates the ultimate acquirement of five million acres of forest lands on the watersheds of important eastern rivers. There has not been a single break in the continuity of the work. During the present fiscal year, which ends June 30, 1922, the appropriation was $1,000,000.

Now comes the Bureau of the Budget with its appropriation estimates for the Department of Agriculture for the next fiscal year, and it reduces the item for the acquisition of land under the Weeks Act to a paltry $50,000. If the item stands, it means practically the complete suspension or postponement of forest land purchases in the East, and this just at a time when the Government can buy land most advantageously. It is presumed that the Bureau of the Budget justifies its action on the ground of enforced economy. American Forestry recognizes the desirability of upholding the budget system and it endorses governmental economy when it is shown to be real economy and not at the expense of public interests or federal responsibility. In this instance it believes the Bureau of the Budget proposes

a mistaken economy. Let us examine briefly the operation of the Weeks Act.

Since initiation of the acquisition work in 1911, the Government has acquired 2,047,718 acres of forest land at the head waters of navigable eastern rivers. The cost to the Government, including the land, examination of titles, land surfaces, and all overhead expense, has been $5.99 per acre. Since its acquisition this land has steadily increased in value. Many of the tracts have more than doubled in value and the demonstrable value of the entire holdings, including land and timber, is placed by the Forest Service at more than $19,000,000. This is an increase of 60 per cent over their original cost and the estimate is admitted to be a very conservative one. In addition, the area is returning to the United States Treasury over $100,000 annually by virtue of the sale of timber and other resources under strict regulations which are gradually increasing the timber productivity of the land.

Coming at this particular time, the action of the Bureau of the Budget, if concurred in by Congress, will do more than stop the acquisition of additional land. It will deprive the Government of an unusual opportunity to obtain some very desirable tracts at exceedingly favorable prices. The present economic situation makes now available forest lands at prices probably lower than at any time since the passage of the act, because of the need or desire of many owners to convert their cut-over lands into cash.

The significance of this opportunity is clearly reflected in the proposed purchase approved by the National Conservation Commission in December last, of 135,000 acres of forest land in different tracts at an average of $3.33 per acre, or little more than one-half the average price paid for land previously purchased. According to the Forest Service, it has pending today in localities approved by the commission as desirable for purchase, offers aggregating almost 1,000,000 acres which may be purchased on equally favorable terms.

But let us not overlook the primary object of acquiring these lands. It is to protect and maintain the navigability of eastern rivers and the property and public interests dependent upon their navigability. That it is impossible to express in dollars and cents the value thus served is unfortunate, because, if it were, we believe the Bureau of the Budget would not have dared to recommend the practical suspension of the acquisition work. The responsibility of the Federal Government to maintain the navigability of its rivers is generally and clearly recognized. Any action suggestive of the abandonment of that responsibility as provided for in the Weeks Act should be met by strong and wide-spread public protest.

Other public interests are involved. These lands will not only serve to preserve the headwaters of important rivers, but they will be the sources of much needed lumber in years to come. And today they provide recreational areas of great public value to the densely populated East. Their potential value as timber producing and recreational areas is tremendous.

We believe the Bureau of the Budget has misweighed public interests in halting work under the Weeks Act. The character of this work is such that a steady and continuous functioning of the agencies already established under the act is essential. The acquirement of large tracts of land, if done efficiently and on the best terms possible for the Government, must proceed gradually and without haste. That is the basis upon which for ten years the work has been planned and carried forward, and that is one reason why its results reflect conspicuous efficiency and progress.

If a reduction of the federal expenditures is absolutely imperative, let it be a moderate reduction which will permit the established and well-working agencies to function on an efficient scale, and not a reduction which virtually annihilates the operating agencies. To disrupt the work now not only is sure to be in the long run very expensive economy, but it threatens the resumption of the work on an adequate scale when the financial stress upon the Government may be less acute. An appropriation of $500,000 for the coming fiscal year—one-half that of the present year—will enable the work to proceed in an effective way because of more favorable land values. At its recent meeting in Washington, the American Forestry Association passed a resolution urging upon Congress the appropriation of adequate funds for the continuance of the work. Readers of American Forestry are urged to lose no time in communicating their sentiments to their representatives in Congress.

MORE WORK AND LESS TALK

IF THE ARMY EXPERTS, during times of peace, made no effort to improve guns, ammunition, and equipment, or failed to study new weapons of warfare, we should charge them with laxity, to say the least. If in times of general good health the medical experts made no attempt to guard against the next outbreak of influenza. smallpox, or typhoid, we should say they lacked foresight and energy. But in forestry we show all these forms of laxity and neglect. We are not merely permitting what forests we have left to be destroyed at an appalling rate, but we are not even finding out how to replace them once we show enough courage and energy to call a halt on destruction.

In the long run the intensive practice of forestry, on the scale needed to yield the timber we require, must be based on a minute knowledge of the life-history and habits of trees, singly and in large groups. To get this knowledge will require a vast deal of investigation, ex-

perimentation, patient observation of forests of all kinds —in short, "forest research" on a nation-wide scale.

Forest research occupies a prominent place in the forest policy recommended by the recent National Agricultural Conference. It occupies an equally prominent place in the resolutions passed at the recent annual meeting of the American Forestry Association.

Says the Agricultural Conference:

"Research in forestry has already produced results of incalculable value to the people of the United States and is essential for future progress. Therefore, research in methods of maintaining and increasing the productivity of forest lands and in methods of utilizing forest products should be promoted in every practicable way."

The resolution of the Association points out that "the establishment of an effective practice of forestry in this country depends upon a basic knowledge of the life and growth of our trees and the characteristics of their products," and that "both scientific research in the laboratory and field experimentation and demonstration" are needed to gain this knowledge. The Association therefore urges upon Congress a better financial support of forest experiment stations and of the Forest Products Laboratory at Madison, Wisconsin.

The protection of forests from fire has been much emphasized in the last two or three years as a part of our national program of forestry. Fire protection is highly necessary, but it is not all of forestry any more than killing army worms and chinch-bugs is all of agriculture. Forestry is more than mere protection; it implies the growing of the best possible crop of timber both in quantity and in quality. It means much more than letting nature run wild; it means a constant tending of the forest throughout its life. The difference between a wild forest and a cultivated forest is like the difference between a wild plum thicket and an orchard.

What has forest research to do with all this? Simply this: Forestry is coming sooner in this country than most people believe. But who knows how to practice forestry? Outside of the National Forests, a few state forests, and a few forest schools, there is no body of knowledge of even elementary forestry. For vast areas of forest land, our ignorance of what to do to make them grow really good crops of timber is profound. Some of these days the nation will establish a national program of forestry, and then we shall suddenly find that laws will not make forests grow and we shall be sadly lacking in the knowledge of how to make them grow.

Forest experiment stations should be established immediately in all the chief forest regions to work out these main problems of reforestation and forest management. They will cost this rich and powerful country only half a million dollars a year—an insignificant sum to make us ready for the day when we shall begin to grow timber on a national scale.

We urge the members of this Association to use their influence not only to help these bills through Congress, but to spread the idea of forest experiment stations far and wide, through newspapers, clubs, labor unions, chambers of commerce, schools and the like. Here is a big, concrete job in forestry worth any man's best efforts. Forestry must not remain in the stage of glittering generalities. There has been plenty of talk; let us now get down to hard work on specific jobs.

WILL BUSINESS MEN HEED THE FOREST SITUATION?

ALONG with coal and transportation, forests are first essentials to the prosperity of American business. As evidenced by the experience of 1920, an acute wood shortage pinches first the wood-using industries. Its effects then spread rapidly into related industries which use raw wood or forest products in more limited amounts. Soon business generally is disrupted and thrown into confusion. The coal mines are crippled by lack of mine timbers. The railroads are crippled by lack of railroad ties. Newspapers suspend publication or reduce their editions, and so on. It is a blood-letting malady which overtakes business in diverse and insidious ways.

The forest problem is thus a vital problem for American industry. It calls for the best and most enlightened thought which the business men of the country can bring to bear upon it. It must be worked out in a practicable and businesslike way and on the principle that good business is good only when it promotes the public welfare.

It is encouraging that the business men of the country have already begun to take note of our forest situation. American Forestry awaits with keen interest the report soon to be made by the Forestry Committee of the Chamber of Commerce of the United States. Mr. David L. Goodwillie, a box manufacturer of Chicago, is chairman of this committee and has associated with him men representative of various lines of American industry.

This committee represents the greatest organization of business men of this country. It has spent many weeks investigating various conditions throughout the United States. It has held public hearings from New York to California. Lumbermen, wood users, foresters, lawyers, tax experts and economists have been heard. It has had the benefit of information gathered through years of effort by the Federal and State governments. It has had ample opportunity to view all important angles of the situation and to arrive at definite conclusions.

No greater opportunity ever existed to acquaint the business men of the country with the true state of our forest affairs. The character of the committee's report will largely determine its effectiveness. If the committee finds the situation to be deserving of consideration by the business men—and they can hardly find otherwise—and makes definite, clear-cut suggestions of remedial action, the subject will be brought to the attention of the Chamber's 800,000 members. This in itself would be of tremendous educational value.

NOMINATIONS FOR OFFICERS OF THE AMERICAN FORESTRY ASSOCIATION

THE by-laws provide for the election this year of a president, a treasurer, twenty-one vice presidents, and seven directors of the American Forestry Association.

The Committee on Elections, comprising Dr. Filibert Roth, R. S. Kellogg and Dr. Henry S. Drinker, appointed by the Board of Directors at the annual meeting, received suggestions and nominations for officers and have nominated the following:

FOR PRESIDENT

CHARLES LATHROP PACK
President American Forestry Association

FOR TREASURER

ROBERT V. FLEMING
Vice-President, Riggs Nat'l Bank, Washington, D. C.

FOR VICE-PRESIDENTS

(21 to be elected)

HON. M. L. ALEXANDER——Louisiana
Chairman, Conservation Commission

HENRY C. CAMPBELL—Wisconsin
Editor, Milwaukee Journal

ALLEN CHAMBERLAIN—Massachusetts
Editor, Boston Transcript

FRED C. KNAPP—Oregon
President, Peninsula Lumber Company

EVERETT G. GRIGGS—Washington
President St. Paul and Tacoma Lbr. Co.

MRS. WARREN G. HARDING—Ohio

DR. JOHN GRIER HIBBEN—New Jersey
President, Princeton University

JOHN M. OVERTON—Tennessee
President, Tennessee Forestry Association

THOMAS H. OWEN—Oklahoma
President, Oklahoma Forestry Association

GIFFORD PINCHOT—Pennsylvania
Commissioner of Forestry of Pennsylvania

JOSEPH HYDE PRATT—North Carolina
Director Geological Survey

M. B. PRATT—California
State Forester of California

DR. J. T. ROTHROCK—Pennsylvania
Member of State Forest Reservation Board of Pa.

PROF. FILIBERT ROTH—Michigan
Dean of Forestry, University of Michigan

HARVEY N. SHEPARD—Massachusetts
President, Massachusetts Forestry Association

HON. B. H. SNELL—New York
Member of Congress from New York

BONNEL H. STONE—Georgia
Chairman, Georgia Forestry Committee

MRS. JOHN DICKINSON SHERMAN—Illinois
General Federation of Women's Clubs

HERMANN VON SCHRENK—Missouri
President, Missouri Forestry Association

LOU SWEET—Colorado
President, Colorado Forestry Association

HON. JOHN W. WEEKS—Massachusetts
Secretary of War

FOR DIRECTORS (7 to be elected)

Nominations by the Committee on Elections Appointed by the Board of Directors

ELBERT H. BAKER
American Newspaper Publishers Association

ROBERT P. BASS
Ex-Governor of New Hampshire

F. W. BESLEY
State Forester of Maryland

HENRY S. GRAVES
Former Chief U. S. Forest Service

WM. B. GREELEY
Chief, U. S. Forest Service

GEORGE W. SISSON, JR.
Ex-President American Paper & Pulp Assn.

E. A. STERLING
Forest Engineer

Nominations by a Group of Members Whose Names are Given Below

ELBERT H. BAKER
American Newspaper Publishers Association

ROBERT P. BASS
Ex-Governor of New Hampshire

F. W. BESLEY
State Forester of Maryland

HENRY S. GRAVES
Former Chief U. S. Forest Service

WM. B. GREELEY
Chief, U. S. Forest Service

GEORGE W. SISSON, JR.
Ex-President American Paper & Pulp Assn.

WM. L. HALL
Pres. Hall, Kellogg & Co., Chicago

The members making nominations for directors as mentioned above are: P. W. Ayres, G. H. Collingwood, J. S. Holmes, R. D. Forbes, J. G. Peters, V. H. Sonderegger, A. B. Hastings, Clyde Leavitt, C. D. Howe, J. A. Ferguson G. R. Green, C. R. Anderson, F. W. Kelsey, Edw. Bird Grinnell, Barrington Moore, W. P. Wharton, K. W. Woodward, C. L. Stevens, Karl E. Pfeiffer, H. Nellis, Joshua A. Cope, R. Y. Stuart, W. G. Hastings, R. S. Maddox, J. W. Toumey, R. C. Hawley, S. J. Record, H. H. Chapman, T. S. Woolsey Jr., W. O. Filley, J. H. Foster, R. S. Hosmer, Bristow Adams, A. B. Recknagel, C. H. Guise, S. N. Spring, W. C. L. Bazeley, H. Philbrook, P. T. Coolidge, G. T. Carlisle, Jr., R. D. Craig, I. T. Bode, G. C. Morbeck G. B. MacDonald, L. H. Pammel, Chapin Jones, Ellwood Wilson, Edmund Secrest, H. P. Baker, P. P. Wells.

Of the nominees for directors, Mr. Wm. L. Hall wrote to the Committee on Elections definitely refusing the nomination. It will be observed that the nominations made by the Committee on Elections exactly parallel the nominations made by the above petitioners, with the exception of Mr. Hall. For the seventh vacancy in the list of directors the Committee on Elections has nominated Mr. E. A. Sterling, who has for many years faithfully served the Association as a director.

SIGNED:

FILIBERT ROTH
R. S. KELLOGG
HENRY S. DRINKER
Committee on Elections.

ANNUAL MEETING OF THE ASSOCIATION

THE annual meeting of the American Forestry Association held at Washington on January 26th marked the fortieth anniversary of the organization. There was a good attendance. President Charles Lathrop Pack called the meeting to order, referred to the work of the Association during 1921 and in his address said:

"The year 1922 is a vital year in forestry in the United States. Let us mark this fortieth anniversary with a united front for a forest policy. Thanks to the fine cooperation of the editors of the country the American Forestry Association has awakened hundreds of thousands of people to the value of our forest resources. The Association has preached forestry day in and day out and now Congress is considering a bill providing for a national forest policy.

"Threatening the future prosperity of the country are two big items, our yearly loss from forest fires and our hundreds of millions of acres of forest lands which are not growing forests. Just what this means to big industries in states like New York and New England is shown in the three million dollars a year freight bill New England pays on imported lumber because of the idle acres close to her factory doors. The lumber cut in the state of New York has dropped almost sixty percent since 1910. Her consumers of lumber are paying $66,000,000 a year for imported lumber and $11,000,000 a year for state grown lumber. If that $55,000,000 could be kept in the state you could see what the effect would be. They imported lumber three thousand miles by rail. As a result nearly 1500 wood using industries in the state of New York have closed up shop.

"Timber enough to build a five-room house every hundred feet on both sides of a road extending from New York to Chicago is destroyed by forest fires every year. With four people to a house these one hundred thousand or more buildings would provide a home for nearly one fourth of our yearly increase in population—a number sufficient to populate a new city each year the size of Cincinnati, New Orleans, Minneapolis, Kansas City or Seattle.

"During the past five years more than 160,000 forest fires have occurred in the United States, 80 per cent of which were due to human agencies and therefore preventable. The conflagrations burned over 56,488,000 acres—an area greater than that of either Ohio or Pennsylvania—and destroyed $85,700,000 worth of timber.

"Stop this waste and put that material into houses. If

AMERICAN FORESTRY ASSOCIATION OFFICIALS

From left to right—Charles F. Quincy, treasurer and director; E. A. Sterling, director; Charles Lathrop Pack, president; Col. W. B. Greeley, chief of United States Forest Service, director; Dr. Henry S. Drinker, director; Ovid M. Butler, forester; Standish Chard, director, and Percival S. Ridsdale, secretary and editor of American Forestry.

you do various business interests concerned in construction, such as lumber dealers, carpenters, masons, and supply houses, would, it is estimated, benefit to the extent of more than $400,000,000 annually. Bankers and real estate dealers would also profit by the sale of lands and loans on homes to the extent of an additional $300,000,000. Take that thought home with you and present it to your banker and the real estate man.

"Therefore in welcoming you to this meeting, I want to urge that we present a united front on this fortieth anniversary for forestry. Let us get something done. Let us demand constructive forestry legislation from our national and state legislative bodies. The American Forestry Association can do a greater public service than any organization in the country in 1922. That service is continuing its educational campaign on the need of constructive forestry legislation with greater vigor and force as it expects to do."

Senator Irvine I. Lenroot of Wisconsin in an address on "Our National Forest Problem" emphasized the steady decrease in forest producing area and discussed features of the Snell and Capper bills. He earnestly advocated the speedy adoption of a forest policy.

Col. Henry S. Graves spoke on "The Objectives of a National Policy of Forestry" pointing out first the need of a well defined program of forestry and outlining the benefit to the country which will follow the adoption of a policy which will adequately provide not only for our needs in forest products but for recreational requirements as well.

Dr. Henry S. Drinker, who presided during part of the meeting, told how the business men of the country have come to a realization of the importance of forestry and are now deeply interested in the relationship of a forest policy and business conditions.

The proposed amended by-laws as published in the January issue of American Forestry, were explained by Col. W. B. Greeley who, with Col. Henry S. Graves, urged their adoption and they were unanimously adopted.

The Board of Directors announced the appointment of a committee on elections composed of Dr. Henry S. Drinker, chairman; Prof. Filibert Roth and R. S. Kellogg with Dr. J. T. Rothrock and Philip W. Ayres as alternates.

In the evening a smoker was given with Dr. Filibert Roth presiding. Addresses were made by Col. W. B. Greeley, E. T. Allen, Dr. Hermann von Schrenk, E. A. Sterling, Arthur Newton Pack, O. M. Butler, Axel Oxholm, Prof. Roth and others.

At the afternoon session the Committee on Resolutions, composed of Col. Henry S. Graves, C. F. Quincy, Dr. J. T. Rothrock and Prof. Filibert Roth, presented the following resolutions, which were adopted:

NATIONAL FOREST POLICY

Whereas, the forests of our country are being depleted with great rapidity, with wholly inadequate measures for replacement, and

Whereas the right handling of our forests is essential to every consumer of wood products, to many thousands of manufacturing industries, and to the welfare of the communities in the forest regions, and

Whereas our national and local needs will be met only by the practice of forestry upon private as well as public lands, and

Whereas the character of the forestry problem is such that it will not be solved except by the participation of the public in connection with private as well as public forests, be it

Resolved: That The American Forestry Association urge upon Congress the adoption of a sound national policy of forestry which will lead to the rapid extension of forestry in private forests, and be it further

Resolved: That this policy should aim both toward the lessening of the difficulties in the way of private forestry, such as the present fire risk, unwise systems of taxation, lack of information regarding methods of practice, etc., and at the same time toward the establishment of such feasible requirements by the public in regard to private lands as may be essential to secure effective results and as will justify the public expenditures in co-operation with the states and private owners in fire protection, reforestation, research and experimentation and other measures of assistance.

ACQUISITION OF FOREST LANDS

Whereas our public forests constitute an essential feature of a national policy of forestry, as a factor in timber production, in conserving water resources, in building up local communities and in demonstrating methods of forest practice, and

Whereas the National Forests established by recent purchases in the eastern mountains are rendering a great public service, and

Whereas the lands already acquired comprise only a portion of the forest lands that should be owned by the public in these regions, be it

Resolved: That The American Forestry Association urge upon Congress the appropriation of adequate funds for the continuance of the purchase of forest lands under the Weeks Law.

FORESTS OF THE PUBLIC DOMAIN

Whereas there are large areas of forest lands chiefly in the west owned or controlled by the United States, which today are without adequate protection and management, be it

Resolved: That The American Forestry Association urge upon Congress that appropriate legislation be enacted for the incorporation of such areas in the system of National Forests.

SUPPORT OF RESEARCH

Whereas the establishment of an effective practice of forestry in this country depends upon a basic knowledge of the life and growth of our trees and the characteristics of their products, and

Whereas there are required for the acquirement of this knowledge both scientific research in the laboratory and field experimentation and demonstration, be it

Resolved: That The American Forestry Association urge upon Congress the necessity to provide increased financial support for the research work conducted by the Forest Service at the various Forest Experiment Stations and at the Forest Products Laboratory at Madison, Wisconsin.

TRANSFER OF FOREST SERVICE

Whereas the success of the federal work in forestry, in the administration of the National Forests, in building up the basis of practice of forestry on private lands throughout the country, and in research in forestry and forest utilization, would have been impossible without the centralization of all the work in a single technical bureau, and

Whereas the interests of forestry are inseparable from those of agriculture because more than 60 per cent of the forests in the long run will be in small ownership either attached to farms or interspersed among farms and because in a large part of the

country the development of forests and of agriculture must go hand in hand and are interdependent, and

Whereas there is a definite movement represented by bills in Congress and by various recommendations to Congress to transfer the Forest Service from the Department of Agriculture to the Interior or some other Department, and

Whereas such a step would inevitably lead to the division of the federal work of forestry among two or more departments with a consequent duplication, weakening of leadership, and lessening of the effectiveness of the work in many directions, be it

Resolved: That The American Forestry Association earnestly protests against the proposal to transfer the Forest Service or any portion of it from its present jurisdiction in the Department of Agriculture.

FOREST FIRES

Whereas the most serious agency of forest devastation is fire, and

Whereas we are not yet in control of forest fires, the annual amount of land burned each year reaching an aggregate of about 12,000,000 acres with direct annual loss of no less than $17,000,000, and

Whereas security from forest fires can be attained only through the organization of protective work of all owners under a single system directed by the public, be it

Resolved: That The American Forestry Association urge upon the federal Congress and the legislatures of the states to make adequate appropriations for this basic feature of forestry work.

PINE BLISTER RUST

Whereas The American Forestry Association recognizes the grave menace to the extensive public and private five-needled pine forests of Western North America from the recent discovery of the white pine blister rust in the Puget Sound region of British Columbia and Washington, and

Whereas the white pine blister rust is generally established over a large area in Wisconsin and Minnesota and throughout the white pine regions of the Northeastern States where it is increasing at a rapid rate, thereby menacing the continued production of white pine which is essential to the maintenance of the necessary timber supply and therefore to the welfare of the country, and

Whereas the deceptive character of the disease makes it imperative to arouse the owners of Eastern White Pine to this serious situation, to convince them of the immediate need for the general application of the demonstrated practical, effective and inexpensive control measures, in order to save the young pine crop and keep the forest lands productive; therefore be it

Resolved: That The American Forestry Association urge federal co-operation with the Dominion of Canada, States and others interested in safeguarding the five-needled pine forest resources of Western North America, in providing necessary funds and taking adequate measures to meet the emergency situation created by the discovery of the white pine blister rust in the Northwest; and be it further

Resolved: That this association urge that federal and state blister rust quarantine regulations be strictly enforced to prevent the introduction and establishment of this destructive disease in uninfected regions, and be it further

Resolved: That this Association urge adequate Federal and State appropriations for combatting the blister rust in the Northeastern and Lake States by instructing pine owners in the best methods of control through systematic personal contact and demonstration, thereby maintaining the continued commercial production of white pine in these regions.

INSECT CONTROL

Whereas the depredations by insects is one of the most serious causes of forest destruction; and

Whereas on the Pacific Coast there is one infestation which has destroyed within the last ten years timber aggregating in amount no less than 1,500,000,000 feet, valued at not less than $4,500,000.00; and

Financial Report of the American Forestry Association for 1921

ASSETS

Cash	$24,543.20
Investments	25,271.00
Accrued Interest	1,169.23
Accounts Receivable	365.03
Stamps, etc.	368.00
	$51,716.46

LIABILITIES

Bonds Outstanding	$10.00
Accounts Payable	6,424.27
Notes Payable	4,000.00
Subscriptions for 1922 Prepaid	10,170.95
Surplus	31,111.24
	$51,716.46

EXPENSES FOR 1921

Magazine Production	$43,042.53
Membership and Editorial Office	31,198.86
Membership Solicitation	10,168.54
Meetings and Legislative Campaigns	1,737.78
Educational and Publicity	11,016.69
Net Operating Profit	12,128.21
	$109,292.61
Equipment Purchased	1,200.00
Excess Income over Expenses	12,615.93

INCOME FOR 1921

Membership Dues and Circulation	$58,074.46
Advertising	8,503.66
Book Sales, Net	870.88
Premiums, Net	17.33
Donations for Educational and Scientific Work Secured Through Efforts of Charles Lathrop Pack	41,826.28
	$109,292.61
Net Operating Profit	12,128.21
Interest on Investments	1,355.84
Interest on Deposits	81.38
Interest on Horgan Bequest	250.50
	$13,815.93

Whereas other infestations are threatening American forests elsewhere, as, for example, the spruce-bud worm in the Northeast and pine borers at various points; and

Whereas no provision is made in the annual appropriations of Congress to meet this urgent situation, be it

Resolved: That The American Forestry Association urge upon Congress the necessity for giving consideration to this serious danger to the forests and to providing in the annual appropriation for the Forest Service and Bureau of Entomology, funds to meet this situation.

COMMENDING PRESIDENT HARDING

Whereas the President of the United States, in his excellent address before the National Agricultural Conference on Monday, January 23, emphasized the need of forestry and urged upon the farmer the importance of conserving and expanding the timber resources of the farm, be it

Resolved: That The American Forestry Association express its appreciation and commendation to the President for his interest and support of the forestry movement.

GRAVES RETURNS TO YALE FORESTRY SCHOOL

IT has recently been announced that plans long under consideration by Dean James W. Toumey, of the Yale School of Forestry, are now consummated in the arrangement whereby Colonel Henry S. Graves, formerly Chief Forester of the United States, is to return to his former position as Dean to the School. Mr. Toumey desires to resume his more purely scientific work and Mr. Graves, in view of the widening opportunities afforded to the school by its recent developments, is returning enthusiastically to his old post.

Coming coincidentally with the announcement that a further substantial increase representing the income on a quarter of a million dollars has been added to the School's resources, and that three hundred thousand dollars has recently been received for the erection and maintenance of a School of Forestry building, the news that such a conspicuous forester as Mr. Graves has been called to the faculty of the Yale School will generally be regarded as significant. The fact that Mr. Graves recently declined an offer of the position of Conservation Commissioner of the State of New York on the ground that the Yale School of Forestry offer, then under consideration, promised the greatest field for the national educational work in connection with forests and other natural resources in which he has been engaged since his resignation from Government service, will also be regarded as a significant circumstance. It is believed that the national eminence and international reputation of Mr. Graves will bring a degree of prestige which will directly influence the future growth of the Yale School.

In this connection it is announced that the trustees of the estate of John W. Sterling have decided to establish in the University a fifth Sterling Professorship, to be known as the Sterling Professorship of Forestry. The first incumbent of this Sterling Professorship will be Professor Henry S. Graves, the Dean-elect of the School of Forestry.

Mr. Toumey, whose retirement as dean is a voluntary act, desires relief from executive duties in order to devote himself to more intensive work in silviculture. He has been connected with the Yale School of Forestry since its foundation in 1900, when he became Assistant Professor of Forestry. He was advanced to full professorial rank in 1903, and was assigned to the Morris K. Jesup Professorship of Silviculture when this chair was established in 1909. It is an interesting fact that Mr. Graves was the first Director of the School of Forestry, and retained that position until 1909. Mr. Toumey was Acting Director during the years 1909-1911, since when he has served as the administrative head of the school. Under Dean Toumey Yale's youngest school has attained marked success, extending its educational scope, adding to its equipment, sending its graduates into every form of service in the widening field of forestry. No other school of Yale University has enjoyed a more remarkable development than has the School of Forestry under the administration of Dean Toumey.

The new Yale Dean of Forestry was one of the pioneers in the forestry movement. He first came into prominence during the period of his office as Director of the Yale School of Forestry. In 1910 he was selected by President Taft to succeed Gifford Pinchot as Chief Forester in charge of the Forest Service in the United States Department of Agriculture. Later, in 1920, he resigned to devote himself to the private practice of forestry, opening offices in Washington, D. C.

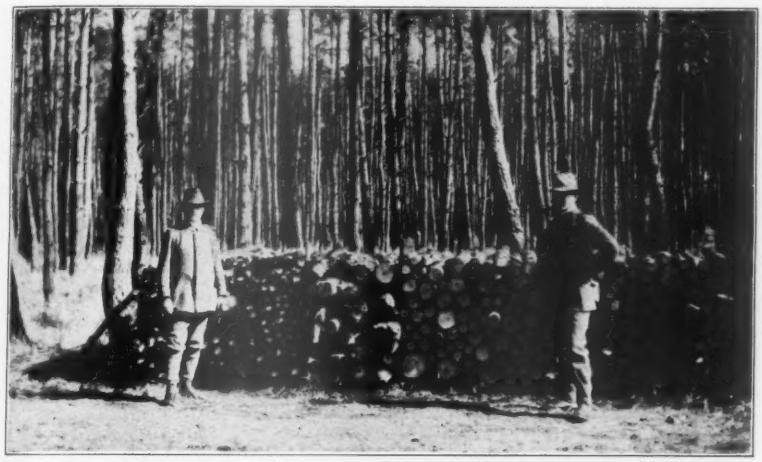
In 1917 Mr. Graves was commissioned a major in the Corps of Engineers and was sent to France to prepare for the work of the forestry troops then being organized to operate the French forests for the purpose of securing lumber and other material needed for the American Army. He was later promoted to a Lieutenant Colonelcy in the Tenth Engineers.

Mr. Graves is a member of the board of management of the Washington Academy of Sciences, vice-president of the Section of Social Economic Sciences of the American Association for the Advancement of Science, a member of the Division of States Relations in the National Research Council, a member of the Joint Committee on Natural Resources of the National Academy of Science, National Research Council and the American Forestry Association, an honorary member of the Royal English and the Royal Scottish Arboricultural Societies, a member of the Societe Forestiere de Franche Comte d'Belfort, member of the Society of American Military Engineers, and a member and officer in numerous societies and organizations for the advancement of forestry and kindred subjects.

PINE ROOTS AND POTATOES

By Arthur Newton Pack

THERE was once a time before the war when cheap German grown potatoes could be bought in the markets of New York, Philadelphia and other Atlantic points for less than it cost to produce the American spud; but we need not worry about its occurring again. Just now the German potato is very much needed at home. Prior to 1914, Germany was seldom able to produce more than 60 per cent of her entire food requirements and indeed there were many who felt that starvation would force her to end the great war long before she did. It will always remain a miracle as to how her people managed to subsist during those four lean years of war, and the fact that they did not die in hundreds of thousands is only attributable to Germany's marvellous efficiency in the development and distribution of such food as she was able to produce or smuggle in. In many parts of the country, the potato was during that time almost the sole article of diet, and every square foot of space which could be made available for truck farming was put to work.



TRUNK, ROOT AND BRANCHES

Here is a pile of corded pine to be rationed out by the governmental authorities. All small sizes are used so that no available fuel wood is lost.

Coal was always scarce in Germany, and the struggle for the possession of the regions where it might be found undoubtedly figured largely in her plan of imperial domination. Nearly all her home heating and cooking was by means of wood fires. During the war even the meager supply of coal available for home consumption was commandeered for army and munition manufacturing purposes, and for all the forests, a fuel famine was added to the other distresses of the people. Most of the towns and cities of Germany own their own wood lots dating back for five or six centuries, and they usually operate them through state or municipal agencies on the principle of a tree for a tree. It was not always so, for Germany once almost completely exhausted her forests. So terrific was the lesson that even the greatest war of history has never wiped it from the minds of the people. As the government had no mind to permit the destruction of the forests during the past war, and thus involve the nation in a future problem far more serious, wood fuel soon took a prominent place upon the list of daily necessities rationed out.

The municipal forests, more carefully guarded than ever, stood between the nation and famine. In the beech wood lots, even the nuts, for there was a very large crop during 1916-17 and 18, were gathered and, because of their oily contents, used in place of lamps and candles in the homes. In the pine forests, when an area was cut for fuel, even the stumps and roots were tipped out and split up to supplement the supply. Then, immediately an area was cleared, the ground was ploughed or dug up by hand and sown with alternate rows of pine seed and potatoes. Two or three crops of potatoes could be obtained from the land before the trees became large enough to interfere. Although her nitrates had largely been re-allocated from agricultural to war-time purposes, one thing that Germany did have was fertilizing material. Of course, now the war

FOOD AND FUEL FROM THE SAME FIELD

Two years ago this was a city wood lot; twenty years hence it will again be producing fuel. But in the meantime, successive crops of potatoes will alleviate the food famine.

(Continued on page 178.)






WHAT YOU CAN DO — AND

Upper—How "Cloudy Pass" gets its name.
Middle—The author does a successful stunt with a flapjack.
Lower—View looking south from Cloudy Pass trail.

WHAT YOU CAN SEE

Upper—Catching a native trout in Hart Lake.
Middle—A woodland cottage on Lake Chelan.
Lower—The snout of Lyman Glacier, where flows a river.

WITH THE GRAPHLEX IN CHELAN

By C. J. Blanchard

(WITH PHOTOGRAPHS BY THE AUTHOR)

"DRAT that pup," exclaimed the Englishman, "if he don't quit that infernal howling I'm going to tie him to a waterfall and drown him." Quite unmindful of this dire threat the pup continued to voice his rage loudly at some mysterious animal which, securely entrenched on a narrow ledge above the camp, was tormenting his enemy by whistling shrilly. Sleep being out of the question, we crawled from under the blankets and came forth into the chilly mountain air.

THE TOP OF THE WORLD

Near the summit of Cloudy Pass. Magnificent scenery abounds in this unsurpassed vacation country.

It was such a morning in August as only those who dwell in the mountains enjoy. The air was a tonic, crisp, laden with the odor of pine and balsam, and cooled by the ice and snow of innumerable glaciers all about us. The sun had not yet climbed the range on the East, and the tiny valley on the shore of Lyman Lake was in soft shadows. Save for the dog and the marmot on the cliffs all was silence. The forest ranger and guide moved noiselessly about his task of making the fire, the others busied themselves about the camp, while the writer strode to the outlet of the lake, where a swift stream tumbled into the valley. With hook baited with a single salmon egg, each cast lured a half pound native trout to shore and the frying pan. Fried crisp and brown in bacon fat no epicure ever dined more sumptuously.

With movie camera securely strapped to the pack horse we climbed into our saddles and started west to ascend the mountain. Our objective was Lyman Glacier, now gleaming white in the morning sunshine. With frequent stops to admire and photograph the charming views enroute we reached the moraine. Spellbound, we gazed upon this wonderful spectacle. Above our heads was a perpendicular wall of green ice fifty feet high, sloping back for more than two miles to the bare face of the mountain. Resting in its cirque Lyman Glacier is a huge block of ice five miles in circumference, and perhaps hundreds of feet in depth. The prodigality of nature in her ice making impressed us as utterly wasteful, and the thought came how much

ON THE SHORE OF LAKE CHELAN

Switzerland offers nothing more beautiful than this lake, deep bosomed in the heart of the Cascades.

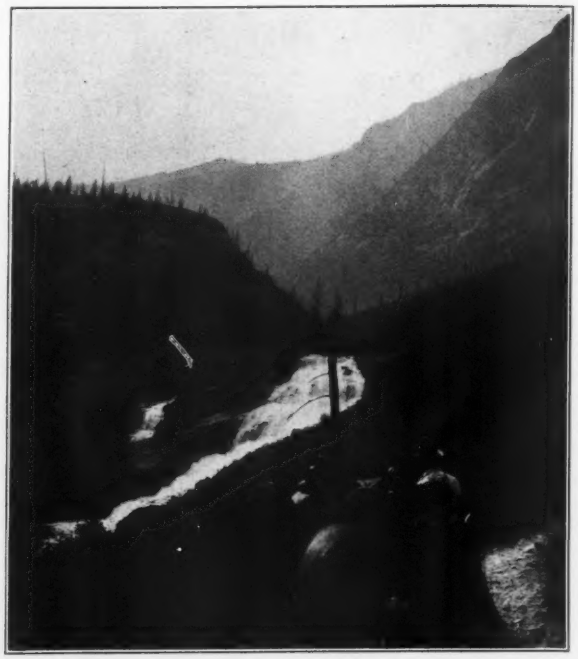
better had it been if this great mass of coolness could have been manufactured near New York. From the snout of the glacier we penetrated a large cavern for fifty feet or more until the sharp cracking drove us precipitately out into the sunshine.

Dividing our photographic impedimenta equally among the party we started on our walk over the surface of the glacier and headed for the pass, a semi-circular notch in the mountain. Our guide in advance carefully picked the trail, avoiding crevasses and hidden pits full of melted snow. As we approached the northern edge of the glacier we stopped to film several hanging glaciers set in circular depressions and apparently held in place by ridges of rocks at the lower edge. Suddenly without warning an enormous mass of ice broke off from one of the glaciers, and loosening the rocks below started a veritable avalanche. Immense boulders sprang straight out from these ridges, and dropping from cliff to cliff

A READY MADE FOREST SERVICE CAMP

This is one of the camps the Service supplies for the benefit of visitors. Trout caught just ten feet away from the stove are being fried for dinner.

swiftly sped downward to the ice upon which we stood. So great was the impetus that many were carried beyond us, and one reached the leg of the tripod of the moving camera. We gathered up our belongings and beat a very hasty retreat to safety. For an hour or more the downpour of rocks continued with deafening roar. With the passing around of the sun the cool air soon stopped the melting of ice and quiet was once more restored. From time to time we encountered great crevasses of unknown depths. Far down in these we heard the sound of the rushing waters which contribute to the powerful stream emerging through the cavern in the glacier's snout. A misstep and that would be the end. Pressing on we reached the summit and glimpsed for the first time the western slope of the Cascades. The view was inspiring and beautiful. Immense forests, vistas of plains and valleys unfolded to our delighted vision.



A GLIMPSE OF THE WONDERFUL SCENIC COUNTRY

Every true nature lover will enthuse over a trip to the Chelan country.

Back to the camp we came for another night of soothing sleep on beds of pine boughs. With lusty appetites we devoured a tasty "mulligan," the delectable concoction of the Forest Service man.

Another day dawned and we left camp for Cloudy Pass. The scenery was magnificent every foot of the way. Half way up we stopped to rest the horses and chat with a couple of miners digging out thin sheets of

BREAKING CAMP FOR THE HOMEWARD TRIP

A driving storm blowing up the pass hastened our return to the valley.

JUST BITS ALONG THE WAY

First—our good ship Ranger, the Forest Service boat; then Terrace Falls, above Lyman Lake, one of the most beautiful of the many waterfalls of the Chelan country; the movie outfit and pack horse; filming a hanging glacier from Lyman Glacier; the pup who finally had revenge; returning to camp across Lyman Glacier; early morning on Lyman Lake, trying "fisherman's luck;" the stop for lunch at the mine, and looking back one sees the lovely valley where we camped and distant Hart Lake beyond nestling between granite mountains, and finally Lyman Lake, with Crooked Falls lying between it and Glacier Lake, and Lyman Glacier and Pass.

almost pure molybdenum. A hospitable cook had only to suggest once that we tie up for lunch.

Just above the mine is located one of the most impressive waterfalls we have ever seen. We ventured to call it Terrace Falls. The photograph does not do justice to it. From the camp the falls appear to spring boldly out from the cliff, the face of which is indented by a series of irregular shelves or terraces over which the water is dashed into foam and spume. The entire drop must be fully a thousand feet and the volume is quite large.

From this point a backward look showed us the tiny valley wherein we had camped and distant Hart Lake beyond nestling between granite mountains.

Cloudy Pass, reached over a Forest Service trail, offered no great obstacles except at one spot where a fallen tree held us up until the ax had cleared the way.

The attainment of the summit was too easy for what we found there. We would have been willing to pay for the sight which met our eye by strenuous labor had payment been required. The view was by far the finest on our trip. Lofty mountain ranges topped by peaks soaring into the clouds snow tipped, dressed in glaciers, deep canyons through which we looked out upon wide valley and plain and forest spread out before us. Here was in truth the top of the world, a world of light and color and beauty indescribable. Before our eyes had grown satisfied with the view a driving snowstorm blew up the pass and hastened our return to the valley.

Early the following day we started back to Lucerne, on the shores of Lake Chelan. Reaching our destination early that evening we loaded our equipment on the good launch Ranger and headed for Chelan and civilization again.

Our exploration of Chelan and its wonders will keep for another time. Because I know every true nature lover will want to make a trip to Lyman Glacier I'm going to tell you how to do it.

To reach Chelan on the lake you travel by rail to the station at Chelan, Washington, where the auto bus meets you for Chelan. Take a boat here for Lucerne on the lake. Here pack horses and guides are obtainable and camp outfits are provided. From Lucerne your route will be on an abandoned railway grade up Railway creek to Hart Lake, and thence over the forest trail to Lyman Glacier and Cloudy Pass. No hardships will be met, the mileage is not great, but the ever-varying scenery, much of which approaches the sublime, contributes to make the trip one of enduring memory.

PINE ROOTS AND POTATOES

(Continued from page 173.)

is over, Germany can theoretically once more obtain food from the outside world, but the depreciation of the Mark has made it very difficult for her to import any quantity, and only the wealthiest can afford the luxury of an all round diet. The poor still subsist upon potatoes, and row upon row may still be seen growing along with pine seedlings on the cut-over patches.

There are some in America who think that forestry and agriculture are so widely divergent as to make it advisable to divorce them, and place them under separate governmental departments. Yet the nearer we come to the enforced practice of forest conservation, such as has been the long established feature of continental European nations, the more we are obliged to recognize the close relation between the two sciences. In practically every nation on the earth wherever agriculture and forestry are both extensively practiced, both are regarded as a phase of agriculture, and both farms and forests are centralized under a single department. Among the wood-using industries of America, sentiment is turning more and more toward forest conservation and growth. Prlactical intensive forestry on a commercial basis is for us not very far ahead, and no section of the American people will be more affected thereby than the farmers of the country.

MATCH MAKING

Many types of machinery are used for match making. To produce the matches, the boxes into which they are packed and the labeling of boxes requires a very ingenious mechanism. There must be machines for cutting the lumber into strips and small blocks, for dipping the sticks, drying the matches, and packing and labeling the boxes. Wood for the production of matches and match splints must be easily worked and capable of producing a moderate flame and must also have the capacity of holding and dipping material well. The United States is the only country in the world which makes and uses a round match. For this purpose white pine is used in great quantities. The industry calls for 2-inch boards or deals of clear stock free from all defects. The soft wood of clear white pine is necessary for this process because the machines in common practice punch the sticks from blocks of the proper length. The square matches of the "safety" type, which are commonly used throughout foreign countries, and to an increasing extent in the United States, are made by turning logs into veneer and chopping the veneer into suitable sizes for the splints. Basswood and aspen are the species mainly employed. While the United States produces its own square matches to some extent, over 5,000,000 gross of boxes are imported annually. Spruce veneer is used in the manufacture of the paper-covered wooden boxes.—*Daily Bulletin, Southwestern District, U. S. Forest Service.*

COLONEL GRAVES ON THE SNELL BILL

COL. HENRY S. GRAVES, former chief of the United States Forest Service, who was invited by the Agricultural Committee to give his views on a national forest policy during the hearings on the Snell forestry bill, gave evidence at length to the members of the committee. He made, in addition to answering the questions of the committee, the following statements:

"The accomplishments in forestry which we already have secured have been so far largely the result of public effort. That is very proper because the public must first of all provide for the right handling of the forest properties which it owns itself, setting an example for other owners, and the public has certain responsibilities in taking such action as is essential to remove some of the obstacles which are very real in the way of the practice of forestry on private lands. Private owners in many places have cooperated with the Government and the States in these public efforts. In some places they have not lent such cooperation, and forestry has been to that extent retarded on the public side.

"You have now been told that the public should go a great deal further and should embark on a broad policy which will really reach some phases of working out the forest problem which we have hardly touched, and to make the entire undertaking more effective all along the line, and some of the features of public effort which are being advocated are primarily for public purposes, quite regardless of their relation to private forests. Some of these are included in the measure before you. I refer, for example, to the extension of the national forests, extensions to include larger areas that are now in the public domain, and their extension through purchase. I refer to such measures as would increase the efficiency of the Government in its own work, assistance to the states in primary public measures. Some of these measures which are advocated and have to do primarily with public efforts without reference to private purchases will have a very great bearing on the question of private policy, as for instance the public forests will have a large influence on the practicability of private forestry in this vicinity, through centers of cooperation and fire protection, through demonstrations of methods and in other ways.

"We propose to go still further and undertake to work out some method by which our private forests can be better handled, will be perpetuated and will in the long run render the service which is essential.

"The problem of forestry cannot be passed up entirely to the public. Even if we have a very ambitious program of public forests we still have got to rely very largely on private forests for our timber supply and for other service of the forests. I presume that today not over 5 per cent of the lumber on the market comes from the public forests. The rest comes from the private forests. As time goes on this ratio will change, but there always will be a very considerable part of the material used by our country that comes from the forests which will have to be derived from private lands.

"While there is a good deal of difference of opinion as to the exact steps which you can take to bring about the better practice of forestry on private lands, I believe every one is agreed—all are agreed—that it is going to require a broad and liberal policy on the part of the public to work out any comprehensive and practical program.

"Any program is going to involve a lot of public money on the part of the Federal Government and on the part of the States. I believe such expenditures are necessary and are justified by the magnitude of the interests involved, but the public, in my opinion, is not going to appropriate those moneys unless they have a clear understanding of the reasons why they are essential, an understanding of what returns, public returns are expected, and a definite assurance that the actual objects will be accomplished in practice.

"I do not think that the Snell bill gives that definite assurance. This, like other methods, calls for a large program and large expenditures of public money, and this measure, (if this plan were adopted) or any other measure, if it is going to have the practical backing of the country sufficient to warrant the expenditure of funds from the public treasury, has got to have the assurance that forestry is going to be carried on on private lands to the extent that measures will be adopted which will fully safeguard the public interests. It is for that reason that if this measure is to be adopted, in my opinion there should be injected into it an entirely different viewpoint regarding the requirements of the private owner than I read into the language.

"I have approached this question of a national forest policy which would include the private forest problem from a somewhat different angle than Mr. Pinchot. I have approached it from the standpoint of utilizing our State machinery already in existence in a good many of our States, and using State authority for carrying out necessary measures in securing a sound system of taxation, and using the State's police power in imposing such requirements upon private owners as may be necessary in carrying out such a program.

"The ideas that I had worked out while I was in charge of the Forest Service are similar in this general framework to the bill before you. The first two sections of the bill which relate to the private lands do not, however, in my opinion, give the assurance of the practice of forestry which would justify the large expenditures called for, or enable one to give assurance to the public that the results aimed at by this measure will be secured.

"The requirements of what the private owners have to do, of course, differ under different conditions, but the point is that under this legislation there would be a great many owners who would not use the methods which are essential for adequate protection of the forests or for adequate perpetuation, and my idea is that they should be

all brought under the same system, and that they should be controlled through the State authority.

"If we use the basis of this bill and substitute for this general, rather vague language in the first two sections, a really mandatory provision, the State which failed to enforce the regulations on private individuals would also fail to receive the cooperation of the Government.

"I would not at all minimize the fact that in the timber exporting States sentiment in favor of really getting down to the practical practice of forestry on private lands and the imposing of regulations through State authorities on private owners is exceedingly small. I am candid to confess that during the past year I have been greatly disappointed in the reading of the accounts of those who have been promoting this measure; that that feature of the plan looking to real effective legislation on the part of the States has been not emphasized, or so glossed over as to give the impression that this measure is not one which looks to requirements by a State on the part of owners to do what I believe to be essential, to perpetuate their forests, but that it is rather a measure looking to public cooperation, education and encouragement."

In answer to a direct question, Mr. Graves said:

"I am opposed to the Snell bill as it reads today. I would like to read a tentative draft of what I would consider as an effective bill under this general plan. Substitute for paragraphs 1 and 2 of the Snell bill the following:

" 'That the Secretary of Agriculture, through the Forest Service, is hereby authorized and directed, in cooperation with the appropriate officials of the various States, or other suitable agencies, to determine for each forest region of the United States the essential requirements in protecting timber and cut-over lands from fire and proper methods of forestry.'

"The idea of this is to make the expenditure on the part of the Federal Government in this cooperation which is proposed in this bill contingent upon the States putting into effect mandatory legislation.

"I have a few objections to Mr. Pinchot's proposal, or the Capper bill. Briefly they are these: I think in the first place it looks too exclusively to the big timber land owners, and to the big lumber operations, and does not provide sufficiently for the great areas of second growth and cut-over lands, and lands in small ownership. The old timber is going pretty fast; the actual number of owners of it is comparatively small—I presume not over about two thousand of the really large tracts of timber lands; the bulk of our forests are already today of the character of second growth and cut-over lands, and I do not see that the Capper bill is looking sufficiently—provides sufficiently for the requirements on the part of the public for the handling of that class of land. I do not think that that bill—and certainly not this measure before you—sufficiently provides for the great service—considers, rather, the great service—of the forests in the development of the sections of the country where the forests are located. In fact, at the end of Section 1 it uses this expression, referring to the methods of forestation which should be used: 'Favorable forest protection and renewal, with a view to furnishing a continuous supply of timer for the use and needs of the people of the United States.'

"That is only one service of the forest and one purpose of this whole proposition. We have got a great land problem which concerns nearly a third of the area of the country, and the way the forests are handled upon it is going to have a profound influence on the development of the region and on the maintenance of local industries and the building up of agriculture and an industrial structure in the rural communities, and I do not think that the Capper bill gives sufficient consideration to that viewpoint, because it is apparently aimed too exclusively toward the problem of the large timber tract and the large lumberman.

"The third point is the one I have just mentioned, that it is to distinguish between fire protection, which it presumes will be handled by the State, and silviculture, which is going to be primarily a requirement of the Government. I think that if you have a Federal law which deals directly with the private owner, the question of the requirement of fire protection and the requirements for cutting, whatever those may be, should go together.

"And finally, I think any Federal law of that kind is likely in the long run to tend to reduce the responsibilities—speaking of responsibility on the part of the individual States. I think any strong, permanent policy of forestry should place the largest burden, the largest responsibility, down the line; have the States doing their part, making their appropriations, and assuming their responsibilities in every direction, but if you place the control of this feature of private lands on the Government I do believe there is going to be a tendency for the States to feel that the Government is assuming the responsibility and they can also assume the burden, exactly as in some cases there has been a tendency here and there in the operation of the Weeks law—I mean the portion of the Weeks law dealing with cooperation for fire protection—for individual States to assume that they can either reduce or fail to make the increased appropriations for fire protection because of the Government appropriations.

"And finally, I think that the responsibility on the part of the individual in this whole thing should be emphasized. I do not know that this proposal I have made would do more than the Capper bill. I would like to say with reference to the Capper bill, with entire candor, that if a bill of this kind or a measure of this kind is going to continue to receive, or fail to receive, the backing of those interested in bringing about a national forest program, so far as the insistence on a full carrying out of the right methods on private lands by the owners is concerned, if it continues to fail to receive the backing of really effective State legislation, I for one shall consider that it is not going to be possible to carry it through."

STREET SHADE TREES--BEFORE AND AFTER

By W. R. Mattoon

APPARENT DESECRATION, WHICH

Appearance of the sycamore trees along Eleventh street, after the first season of growth following their severe heading-back. The foliage during this first season had looked decidedly scraggy. (Photograph taken in January, 1921.)

THE progress of a very successful operation in trimming street trees is shown in the accompanying photographs. Eleventh Street, N. W., Washington, D. C., is lined with native American sycamores, or buttonballs. They were planted probably about 50 years ago and by 1919 had become so large as to shut out much sunlight and air from the residences. Their appearance was irregular, as some trees had outstripped their neighbors. Some idea of their former size may be had by noting the main trunks and stubs in one of the accompanying figures.

The District authorities severely headed-back the trees in the early spring of 1920, and a vigorous protest went up from some of the property owners and various other residents of Washington, who thought the beauty of this prominent street had been forever spoiled. In reply, they were told to be patient for a little and all would be well.

The correctness of the prediction is here well illustrated. During the first growing season (1920) the trees sent out numerous sprouts which, however, did not make much of a showing or give much promise of what might be expected. In one of the accompanying figures is shown the appearance of a portion of Eleventh street at the end of the second season of growth following the trimming. The picture also gives a good idea of the shape of the individual trees.

More beautiful rows of street trees than those which now decorate Eleventh street could hardly be found. The trees are symmetrical in shape and strikingly uniform in size, and the residents are happy in living on a street lined with some of the most beautiful trees in the city.

PROVED TO BE SALVATION TO THE OLD SYCAMORES

Eleventh street as it appeared toward the close of the second season following the trimming. Rows of trees of striking symmetry of outline and uniformity of size line both sides of the street and make this one of the most attractive and beautiful streets of Washington. (Photograph taken in early October, 1921.)

CANADIAN DEPARTMENT

Ellwood Wilson.

The usual annual meetings of The Canadian Pulp and Paper Association, and its various sections, and the various Associations federated in the Quebec Forest Protective Association were held in Montreal during the week of January 23rd. While not a great deal was done at these meetings the subjects discussed and the action taken was probably the most important in many years. The general meeting of the Pulp and Paper Association voted the money necessary to finish the textbooks of pulp and paper making, to study a system of admitting apprentices to the mills for training and appointed two men to meet with a like number from the Quebec Limit Holders Association and arrange with the Minister of Lands and Forests of Quebec for an advisory committee to meet with him at stated times during the year for the discussion of any proposed legislation or change in the policy or regulations of his department. This is bringing Quebec into line with New Brunswick and British Columbia, both of which Provinces have derived great benefit from such co-operation between the Government and the wood using industries. It is expected that Ontario will soon announce the formation of such a committee for that Province.

At the meetings of the Woodlands Section, it was decided to ask the executive council for a secretary who would also be a trained mechanical engineer and who would investigate new or improved logging methods, visit regions where such are being carried out, report on their feasibility and success, their costs and adaptability to Canadian conditions and distribute such information to the companies represented in the section. He would also act in an advisory capacity to the various logging departments of the companies. Such information would be most practical and valuable and would help to standardize operations and also woods cost-accounting. It was also decided to appoint a new committee to continue the study of a scheme for a ranger-school for the pulp and paper industry where men could receive training for subordinate woods positions. It was decided also to co-operate as closely as possible with the Woodlands Section of the American Pulp and Paper Association. Messrs. Power and McLaughlin read papers on lumbering problems, and Mr. G. C. Piche read a paper and his observations made during a trip to Sweden last summer, when he accompanied Mr. Edward Beck, secretary of the Canadian Pulp and Paper Association.

A very interesting paper was read at the meeting of the Technical Section on the use of jack pine in the manufacture of sulphite pulp. There are quite large areas of this species in Quebec and Ontario and these are increasing as a consequence of forest fires. Heretofore this wood has been used only for lumber, ties and sulfate pulp and it was thought unsuitable for sulfite. Mr. Neilson's experiments, however, show that it is perfectly feasible and economically possible to use it in the manufacture of newsprint, and as it occurs alongside of stands of spruce and fir, it will somewhat cheapen logging operations to bring all of the different species out in one logging operation and will also increase the amount of wood suitable for the manufacture of newsprint. In the past the paper makers have often blamed many of their troubles on this species, but Mr. Neilson shows that many of these troubles occur when it is not being used at all.

At the annual meeting of the Quebec Forest Protective Association papers were read on the ravages of the spruce budworm which is said to have caused a loss of at least 50,000,000 cords of pulp-wood in the Province of Quebec. On the use of aircraft in forest surveys and on the forest fire record of the past season. It was shown that the railroads had caused far less damage than in any previous year. Mr. Kingsland, manager of Eastern Lines for the Canadian National Railways, made the statement that he would do all in his power to prevent the lines under his direction from setting forest fires.

The Quebec Government is introducing additional fire legislation at the present session, which should help in fire protection. The most important item is a requirement that all persons entering upon Crown lands under license must secure a permit from the local fire-ranger. This will be issued without cost and will entail as little trouble as possible. The idea is to have a check on people traveling in the woods and if they know that the fire ranger is aware of their presence it is only logical to expect that they will be more careful as fires can be traced to them. There is, unfortunately, a strong probability that this clause will not pass. Another section provides for the establishment of a Government fire-ranger in each parish or municipality near a forested area, who will issue permits for slash burning or to those who wish to enter the woods, and will have charge of fire-fighting operations. It is also proposed that anyone building or clearing new public roads shall clear up all debris on either side for a distance of 100 feet and burn it in the right of way. That fire fighters shall have the right to enter on or cross over all lands in the discharge of their duties. Legislation will also be

DISSTON
NEWS FOR LUMBERMEN

Published Occasionally HENRY DISSTON & SONS, Inc., PHILADELPHIA, U. S. A. March, 1922

Disston Saw-Makers for 256 Years

WHEN one considers there is no trade which requires more skill and personal judgment than saw-making, the old saying, "that it takes seven years to make a saw-maker," seems well founded. Even after seven years of careful training and practical experience, there frequently arise problems and conditions which only skill and mature judgment can master.

Three Brothers—John, George and James Arnold—and Their Sons Have Been Disston Saw-Makers for an Aggregate of 256 Years

In the Arnold families we have nine men who have plied the saw-making trade for the House of Disston more than twice the stipulated seven years, with the exception of the youngest Arnold, and he has passed his eleventh year at the trade. (One of the Arnold men was not present when above picture was made.)

The length of service of these men ranges from 11 years to 53 years—an average of 28½ years.

The Arnold family is only one of the many Disston families, and only a few of the hundreds of Disston mechanics who have from ten to sixty years to their credit at the saw-making trade.

Visitors who have been through the plant were impressed with the many grey-haired men in every department, and also with the intense interest these men take in their work.

These men started in youth to make saws and have worked at their trade, honestly and intelligently ever since, and they always strive with jealous care, as do also the younger saw-makers, to maintain the quality and workmanship which has made Disston Saws the standard of the industry for the past 81 years.

They Say--

IN our office there is a correspondence file which we call our "inspiration file." Here we keep letters that are written to us by users of Disston Saws, Tools and Files. The following sentences are from a few of the letters taken at random from this collection:

"I use a Disston Saw that my father bought in 1887 and used to build the first house in Whitewood, S. D."—"I have two of your saws that I have used approximately 4500 working days. I have filed them down to less than 1-4 inch at the point, but the temper is the same as when new."—"I sent to Europe for the best saw they could get, and when it came back it had 'Henry Disston & Sons' on the blade. Then I laughed."—"I have one of your cross-cut saws which has been in almost constant service since 1860, and it is today a perfect tool."—"I have one of your saws that is older than I am—46 years. My father had it before me. It is a good tool yet."—"The saws you made for us are giving great satisfaction, cutting more and better lumber than any other saws we have used."

It is indeed an inspiration to us, who are working to maintain and increase the reputation of the House of Disston for superior quality and workmanship, to know that our products are giving this unusual satisfaction to users in every part of the world.

A Magazine You Should Read!

THERE is a magazine, different from all others, published especially for lumbermen. It will be sent free of charge to you if you would like it.

It contains stories of timberland and operations in other countries. There are stories about fires, about filers and sawyers, about big mills and little mills. There are articles on the care of saws—articles prepared by experts from our factory. There is always a page of rattling good jokes.

This little magazine, The Disston Crucible, is widely known and quoted. It is mailed to over sixteen thousand persons, and we have received enough compliments from them to feel that you would like it and find some valuable information in it.

If you would care to receive the Crucible please fill out and mail the attached coupon

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introduced to give a bonus to anyone planting trees, but anyone accepting the bonus will automatically place his lands under the direction of the Provincial Forest Service and will not be allowed to thin or cut his timber without its consent.

A meeting of the foresters of six of the large pulp and paper companies of Quebec was held to discuss a general policy for the forests under license, their report was submitted to the managers of the companies who presented it to the Premier and Minister of Lands, after it had been discussed with the Chief Forester. The Government admitted its general application and agreed that if the companies' foresters would submit working plans to the Chief Forester covering a period of ten years and these were approved by him, it would grant permission to carry them out. This will make for closer co-operation and will stabilize logging conditions and do away with the yearly irritation of fines for cutting undersized trees.

The Spanish River Pulp and Paper Company, Ltd., expect to make a survey of about 1,000 square miles of their limits this summer by aerial photography using a new twin-engined hydroplane designed by the Dayton-Wright Company especially for this work. The results will be looked forward to with much interest.

The past season the Laurentide Company Air Service photographed about 100 square miles and from the photos the areas in the different types of timber have been mapped, also blow-downs, barren areas, second growth and water. The areas are a great deal more accurate than the old-fashioned strip method and the sections where sample plots are to be located are already picked out and on these the timber will be measured shortly and the averages applied to the respective areas. A good general idea of the amount of timber on the area has already been obtained by using averages in areas situated in the general region.

At the annual meeting of the Canadian Forestry Association, Dan McLaughlin, of Arnprior, Ontario, was elected president and R. H. Campbell, director Dominion Forestry Branch, vice-president.

L. M. Ellis, director of forestry for New Zealand, has just issued his annual report for 1921. He says that today New Zealand is in the period of its third forestry "boom" but that whereas the other two accomplished very little this one has come to stay. The forestry department now has 6,800,000 acres in its charge and has made extensive studies and surveys. The saw mill and wood using industries have also been carefully investigated.

The next session of the Ontario Legislature is expected to pass legislation which will greatly improve forestry conditions.

The Chief Forester of Ontario says that only twenty years' supply of virgin pine remains in that Province.

Ellwood Wilson, forester of the Laurentide Company, Ltd., has been elected a life member of the Royal Scottish Arboricultural Society.

FOREST PRODUCTS LABORATORY APPROPRIATION

In behalf of a larger appropriation for the support of the Forest Products Laboratory the representatives of the lumber and wood using industries appeared before a subcommittee of the House Appropriations Committee on February 6 to urge favorable consideration by Congress upon an increase of $100,000 in the funds to be devoted to the operation of the laboratory.

The National Lumber Manufacturers Association joined in this hearing, as it has taken a leading part during the last several years, urging more adequate financing provisions for the laboratory's activities.

HICKORY IN DEMAND

Hickory timber, although held in seemingly vast amount by the forests of the country, may soon become insufficient to meet American manufacturing and woodworking needs. The increasing demand for this valuable species, together with the scattered character of its growth in the forest, has resulted in merchantable stands becoming more and more inaccessible and difficult to log.

The Forest Service, United States Department of Agriculture, puts the country's present supply of hickory, distributed through 200,000,000 acres of forests, at 15,784,000,000 board feet. Of this the Central States have 6,791,000,000 feet, the lower Mississippi States 5,171,000,000 feet, the South Atlantic and East Gulf States 3,183,000,000 feet, the Middle Atlantic States, 412,000,000 board feet, the Lake State 187,000,000 feet, and the New England States 40,000,000 feet.

One of the uses to which hickory is put is in the manufacture of spokes for automobile wheels. The yearly demand upon the hickory reserves by this industry alone is tremendous, as there is much waste in getting the select stock necessary not only for spokes but also the rims of wheels.

For the most part vehicle and agricultural implement industries compete with the handle industry for hickory and ash. These are located mainly in the Middle West, but now derive most of their wood supplies from the South. A large number of far-sighted organizations purchased more or less extensive hardwood tracts some years ago, from which they are now able to draw at least a part of their wood supplies. To secure hickory, which grows scatteringly over large areas, the vehicle and agricultural-implement industries originally maintained extensive buying, logging, and milling organizations in the South. They draw upon every conceivable source—farmers woodlots, small mills, large sawmills, and even specialized operations designed to secure hickory alone. These concerns in general carry in stock about a two years' supply of special-dimension stock.

Makers of automobile wheels say that they can still get the material required if they make sufficient effort and pay the price, but it is necessary to go farther and farther away for it. Many inquiries received by the Forest Service from vehicle implement makers, requesting information on possible substitutes for the woods used in vehicle making, is merely another indication of the difficulties in getting adequate supplies at the present time and of uncertainty as to the future.

Hickory is often referred to as if it were a single species, like red gum or yellow poplar. In reality there are 10 different kinds of hickory trees. For hickory-handle purposes those known as true hickories are most valuable. The pecan hickories include the water, nutmeg, and bitter nut varieties. The true hickories comprise shagbark, pig shellbark, pignut, and mocker nut. The handle industry is largely dependent on this last group of trees for its raw material.

The annual consumption of hickory by the handle trade is something over 120,000,000 feet board measure. Little, if any, of this material passes through the sawmills, for it is ordinarily cut and shipped to the handle factories in the form of log bolts or billets. All hickories do not give the same service when made into handles. The various parts of the same tree may show different properties, and the quality of the wood near the center is quite likely to differ from that nearer the bark.

The wood of the butt of a young hickory tree is of greater average toughness than it is when the tree is old. The wood of butt cuts of both old and young trees is tougher than that cut higher up the trunk. The handle manufacturers, for the most part, demand second-growth hickory, which consists of young stock of rapid growth.

Hickory is the best known material for certain classes of tool handles, such as the ax, adz, pick, hammer, and hatchet. There is a certain strength, toughness, and elasticity to hickory which nature has denied to other commercial woods. Some are stronger, many are harder, but the rare combination of the qualities mentioned is lacking in all of them.

The raw material for handles in the form of short log bolts is sometimes split into handle blanks in the woods, but the usual practice is to rip-saw the bolts into blanks at the factory. The split-handle blank is considered superior to the sawed blank in that it insures a straight-grain handle. On the other hand, sawed blanks, though they are likely to show more cross grain, are more economical in the use of timber.

Hickory, due to its unrivaled properties of great strength, elasticity and resilience, is used almost exclusively in the manufacture of handles for golf clubs. The constantly increasing popularity of this sport has placed another demand on the hickory supply.

"After reading the October, November and December issues of the American Forestry Magazine I am more than pleased to know that they cover all branches intelligently and I get from them continual hints, help, and suggestions."

CHAS. L. CLARK.

THE MOONLIGHT TRAIL

By David L. Goodwillie.

The moonlight trail, oh, that the trail of dreams:
The sunlit trail for labor, but the night
To follow stars, to bathe in silver beams,
Forgetting fact in visions to delight.
Day is too truthful, shows us life too well,
But night is shadowed vales and quiet trees;
Day has no secret that it will not tell,
But night is wonderment and mysteries.

The moonlight trail, oh, that the trail of rest,
The fairy trail unhurriedly we go
And take the cherished dream from out our breast
And, by moon magic, think that it is so,
For there is nothing then that cannot be,
And not a hurt we ever really knew;
Yea, in that hour it seems to you and me
That day's a lie and only night is true.

The moonlight trail, oh, that the vision fair
Of that dear night to follow life's hard day,
When men shall know no more the curse of care
And walk at last some sweet imagined way.
So, if you doubt, and if your faith shall fail,
If day's bright sun can never make you smile,
Get out and walk upon the moonlight trail
And have your visions for a little while.

FARMERS AND FORESTS

"The importance of the relationship between the nation's forestry problems and the farmer was well brought out by President Harding at the opening of the farm conference," said Dr. Henry S. Drinker, a director of the American Forestry Association, who was in Washington at the time the National Agricultural Conference was held.

"The President realizes that the growing of forests is a crop-producing proposition, and we should have forest crops coming along every year, just as we have wheat and corn.

"The great work that has been done by the United States Forest Service along this line can not be overestimated at this time. That work must continue. We of the American Forestry Association are celebrating the fortieth year of a forestry organization at our meeting here. The first organization was in 1882. With such encouragement as this from the President of the United States in his talk to the farm conference, we feel sure that much more will be done for the preservation and protection of our forests in the next forty years than has been done in the past."

HARDING AND FORESTRY

President Harding opened the National Agricultural Conference by directing the attention of the farmer to the importance of forestry. Fifty years ago trees were more bother than they were worth, but today a man with a walnut grove has a fortune, so scarce has become this kind of timber. In the early days every farmer had a wood-lot but now they are few and far between.

Today the center of the lumber industry is nearing the Pacific Coast. The state of New York, which once exported lumber, now pays $55,000,000 a year for imported lumber. The moving of the base of supply increasing distances from the market naturally raises the cost to the consumer. The average farmer spends about $1,000 a year in improvements on his place, but instead of going out to his wood-lot for his lumber he goes to town. He also goes to town for his fuel these days.

The President, in calling the attention of the farmer and the country to the need of utilizing our waste lands for growing trees, is co-operating with those who are now advocating such legislation before Congress. Legislation that will give better protection to the forests so that nature may have a fair opportunity to do the necessary reforesting would be a splendid move and the President's message has broken the trail.

FINLAND'S FORESTS

IN an effort to provide American lumber interests with complete and reliable information concerning the lumber markets and resources of the world, the Bureau of Foreign and Domestic Commerce has just added another exclusive lumber report to its rapidly expanding list of special studies on that industry and trade.

The latest report which covers Finland—an important country from a competitive standpoint—is considered the most comprehensive study of lumber conditions in that country which has yet been published. Formerly, Finnish lumber exporters were content with the markets of Europe. Now, however, they are making energetic efforts to expand to other countries, and it is likely that American lumbermen and exporters will feel the force of this awakened interest.

The report says that Finland has the largest percentage of forest area of any country of Europe, estimating its future exportable surplus at about 2,000,000,000 feet annually. It contains much information which should be of interest to American lumbermen and exporters. Among other subjects it discusses Finland's forests, lumber manufacture, cost of production, export trade, prices, character of timber, markets, shipping, etc. The activities of the Finnish Exporters' Association should be of particular interest to American shippers.

Pleasant Things Taken From Letters to the Editor

"A bunch of us here at Stanford University are regular readers of AMERICAN FORESTRY, and we enjoy it immensely."

CARL WILHELMSON.

"I have been a subscriber to your magazine for only one year but I never expect to be without it again. I am now a student expecting to take up forestry as my life's work and find this magazine a very valuable help to me."

CLARK R. MERIDITH.

"I appreciate AMERICAN FORESTRY very much and wish you success in a most worthy cause."

F. H. CHAMBERS.

"Congratulations on the good work you are doing. I believe AMERICAN FORESTRY is going to take hold more and more on the people, and they need it."

REV. J. W. BACHMAN.

"The article on the Gannet in AMERICAN FORESTRY is excellent; beautifully illustrated, and a good paper all through."

Norwich, England. J. H. GURNEY.

"I am so delighted with the December Number of AMERICAN FORESTRY magazine with its splendid illustrations of Christmas trees, and cannot help wishing that some of my friends also should possess this number."

HERMAN ROSER.

"A wonderful magazine. We appreciate it more and more as each number arrives. It will save the forests of America."

DR. W. C. GALLAGHER.

"I want to congratulate you on the manifest improvement in the magazine. You are giving us more real tree talk. The last two numbers were very fine."

P. E. ALLIOT.

"I read AMERICAN FORESTRY from cover to cover. Our National Parks are of deep interest to us and also the great trees on the Pacific Coast."

MRS. GEO. H. THAYER.

"I greatly enjoy AMERICAN FORESTRY. The information is very valuable to elementary science teachers. I am reading back numbers with much interest."

D. D. DOUGHERTY.

"AMERICAN FORESTRY is great—the pictures especially and there is so much in a picture. I am going to try and get my 41 Deputy Fire Wardens to subscribe for it."

E. N. WRISTON.

"Ever ready for any service in my power for the benefit of the best interests you and our association stand for."

GEORGE VOIGTLANDER.

"Your magazine is an important factor in my reading. I take several magazines and yours has steadily improved. It covers important matters in which every man, woman, and child should be interested."

F. D. FOOTE.

"We certainly like the magazine and feel very sure there is not another magazine that covers the ground so thoroughly and effectively as the AMERICCAN FORESTRY."

GEORGE W. GURNEY.

"I enclose check for $4.00 for dues in the Association. Am glad to help in the great work even though it is very little. Wish you greater success for the coming year."

OSCAR DINWIDDIE.

"I greatly enjoyed Dr. Shufeldt's article on 'cats' in the October number and appreciate the one in November also. Congratulate you on the publication of these popular articles, which are so much needed."

Supt. of San Diego Public Schools.

CARROLL DE.W. SCOTT.

BOOK REVIEWS

The Management of the Harvard Forest 1909-19. By Richard T. Fisher. Harvard Forest Bul. No. 1. Harvard University Press. 1921. Pp. 27. Figs. 20. Maps 3.

Every one interested in technical forestry who has not a copy of this splendid record of achievement in actual forest management, should at once send for a copy. Mr. Fisher, with characteristic modesty, has set forth briefly but most readably the results of ten years of management of the Harvard Forest. It is stimulating and encouraging.

Beginning with the objects of management of this two thousand acre tract in north-central Massachusetts, the bulletin traces the composition and history of the forests of this typical New England region. When the Harvard Forest was first put under management the stand was almost entirely second growth and under seventy years of age. It was 95 per cent even-aged, having originated on cleared or cut-over land.

Aided by constantly improving markets, which enabled complete utilization, the management has been very intensive. From a growing stock of 10,500,000 board feet in 1908 and an increment of 250,000 board feet, the forest has been built up by a sustained yield equal to the increment, to a present growing stock of 12,435,000 board feet with an annual growth of 380,000 board feet. All cut-over areas have been successfully reproduced. The results of the varied methods of cutting employed show that it is possible to bring about reproduction by almost any system of gradual removal. The two-cut shelterwood has come to be adopted for reproducing the pine type—the first cutting is in the nature of a heavy "thinning," the second is a clear cutting.

The slash is piled and burned, usually as the logging proceeds and all hardwood advance growth is cut close to the ground and in *advance of the logging*. Then there is early weeding or cleaning of the young stand beginning in the fourth year after tutting. Besides this there have been release and improvement cuttings in the immature stands and a total planting of 57 acres with a great variety of stock.

A feature of the logging and milling is that of yarding the logs to a central mill site. This is more costly, but well worth while in forests under continuous management.

Costs and returns show total charges of

BOOKS ON FORESTRY

AMERICAN FORESTRY will publish each month, for the benefit of those who wish books on forestry, a list of titles, authors and prices of such books. These may be ordered through the American Forestry Association, Washington, D. C. Prices are by mail or express prepaid.

FOREST VALUATION—Filibert Roth	$1.50
FOREST REGULATION—Filibert Roth	2.00
PRACTICAL TREE REPAIR—By Elbert Peets	2.25
LUMBER MANUFACTURING ACCOUNTS—By Arthur F. Jones	2.10
FOREST VALUATION—By H. H. Chapman	3.10
CHEMISTRY OF PULP AND PAPER MAKING—By Edwin Sutermeister	6.10
CHINESE FOREST TREES AND TIMBER SUPPLY—By Norman Shaw	2.60
TREES, SHRUBS, VINES AND HERBACEOUS PERENNIALS—By John Kirkegaard	2.50
TREES AND SHRUBS—By Charles Sprague Sargent—Vols. I and II, 4 Parts to a Volume—Per Part	5.00
THE TRAINING OF A FORESTER—Gifford Pinchot	1.85
LUMBER AND ITS USES—R. S. Kellogg	2.15
FORESTS, WOODS AND TREES IN RELATION TO HYGIENE—By Augustine Henry	5.25
DEVELOPMENT OF FOREST LAW IN AMERICA—By J. P. Kinney	2.60
STUDIES IN FRENCH FORESTRY—By Theodore S. Woolsey	6.10
FOREST PHYSIOGRAPHY—By Isaiah Bowman	5.10
KEY TO THE TREES—Collins and Preston	1.50
THE FARM WOODLOT—E. G. Cheyney and J. P. Wentling	1.75
IDENTIFICATION OF THE ECONOMIC WOODS OF THE UNITED STATES—Samuel J. Record	2.60
PLANE SURVEYING—John C. Tracy	3.60
FOREST MENSURATION—Herman Haupt Chapman	5.00
FOREST PRODUCTS, THEIR MANUFACTURE AND USE—By Nelson Courtland Brown	4.15
FIRST BOOK OF FORESTRY—Filibert Roth	1.10
PRACTICAL FORESTRY—A. S. Fuller	1.50
PRINCIPLES OF AMERICAN FORESTRY—Samuel B. Green	2.00
TREES IN WINTER—A. S. Blakeslee and C. D. Jarvis	3.50
AMERICAN WOODS—Romeyn B. Hough, 14 Volumes, per Volume	7.50
Half Morocco Binding	10.00
HANDBOOK OF THE TREES OF THE NORTHERN U. S. AND CANADA, EAST OF THE ROCKY MOUNTAINS—Romeyn B. Hough	8.00
Half Morocco Binding	10.00
GETTING ACQUAINTED WITH THE TREES—J. Horace McFarland	1.75
HANDBOOK OF TIMBER PRESERVATION—Samuel M. Rowe	5.00
TREES OF NEW ENGLAND—L. L. Dame and Henry Brooks	1.50
OUR TREES, HOW TO KNOW THEM—By Clarence M. Weed	3.50
TREES, SHRUBS AND VINES OF THE NORTHEASTERN UNITED STATES—H. E. Parkhurst	1.50
TREES—H. Marshall Ward	1.50
OUR NATIONAL PARKS—John Muir	1.91
PRACTICAL FORESTRY—John Gifford	2.50
MANUAL OF THE TREES OF NORTH AMERICA—By Charles Sprague Sargent	12.50
THE IMPORTANT TIMBER TREES OF THE UNITED STATES—S. B. Elliott	2.50
MANUAL OF FORESTRY—VOL I—Ralph C. Hawley and Austin F. Hawes	3.60
THE PRINCIPLES OF HANDLING WOODLANDS—Henry Solon Graves	2.60
SHADE TREES IN TOWNS AND CITIES—William Solotaroff	3.60
THE TREE GUIDE—By Julia Ellen Rogers	1.00
MANUAL FOR NORTHERN WOODSMEN—Austin Cary	2.12
THE THEORY AND PRACTICE OF WORKING PLANS (in forest organization)—A. B. Recknagel	2.60
ELEMENTS OF FORESTRY—F. F. Moon and N. C. Brown	3.60
MECHANICAL PROPERTIES OF WOOD—Samuel J. Record	2.60
STUDIES OF TREES—J. J. Levison	2.10
TREE PRUNING—A. Des Cars	.85
THE PRESERVATION OF STRUCTURAL TIMBER—Howard F. Weiss	2.00
SEEDING AND PLANTING IN THE PRACTICE OF FORESTRY—By James W. Toumey	4.10
FIELD BOOK OF AMERICAN TREES AND SHRUBS—F. Schuyler Mathews	2.00
FIELD BOOK OF WILD BIRDS AND THEIR MUSIC—By F. Schuyler Mathews	2.00
FIELD BOOK OF AMERICAN WILD FLOWERS—By F. Schuyler Mathews	2.00
FARM FORESTRY—By John Arden Ferguson	2.10
THE BOOK OF FORESTRY—By Frederick F. Moon	2.10
OUR FIELD AND FOREST TREES—By Maud Going	1.50
HANDBOOK FOR RANGERS AND WOODSMEN—By Jay L. B. Taylor	3.10
THE LAND WE LIVE IN—By Overton Price	1.70
WOOD AND FOREST—By William Noyes	3.00
THE ESSENTIALS OF AMERICAN TIMBER LAW—By J. P. Kinney	3.00
HANDBOOK OF CLEARING AND GRUBBING, METHODS AND COST—By Halbert P. Gillette	2.50
FRENCH FORESTS AND FORESTRY—By Theodore S. Woolsey, Jr.	3.10
WOOD AND OTHER ORGANIC STRUCTURAL MATERIALS—Chas. H. Snow	5.00
EXERCISES IN FOREST MENSURATION—Winkenwerder and Clark	1.50
OUR NATIONAL FORESTS—H. D. Boerker	2.50
MANUAL OF TREE DISEASES—Howard Rankin	2.50
THE BOOK OF THE NATIONAL PARKS—By Robert Sterling Yard	3.10
THE STORY OF THE FOREST—By J. Gordon Dorrance	.65
FOREST MANAGEMENT—By A. B. Recknagel and John Bentley, Jr.	2.60
THE FOREST RANGER AND OTHER VERSE—By John Guthrie	1.00
TIMBER, ITS STRENGTH, SEASONING AND GRADING—By H. S. Betts	3.10
THE HISTORIC TREES OF MASSACHUSETTS—By J. R. Simmons	2.65
TIMBERS—AND THEIR USES—By Wrena Winn	5.15
THE PRESERVATION OF STRUCTURAL TIMBER—Howard F. Weiss	2.50
THE UNITED STATES FOREST POLICY—By John Ise	5.15
THE KILN DRYING OF LUMBER—By Harry D. Tiemann	4.65
MODERN PULP AND PAPER MAKING—By G. S. Witham, Sr.	6.15
THE PRACTICE OF SILVICULTURE—By Ralph C. Hawley	4.10
WOOD PRODUCTS — W. Dumesny	6.50
GUIDE TO THE TREES—A. Lounsberry	3.00
THE TREE BOOK—Julia Ellen Rogers	6.00

*** This, of course, is not a complete list, but we shall be glad to add to it any books on forestry or related subjects upon request.—EDITOR.**

$31.80 per M. ft. b. m.; an average price of $35.00 per M ft. b. m. for lumber sold; leaving $3.20 per M ft. b. m. net profit. This proves that lumber can be grown continuously on an organized forest for the prevailing market price.

Various tables bring details of area and age by forest types; stand and increment; and summary comparisons of types areas in 1909 and 1919. These last are arranged according to "periods" of 20 years each; 3 periods in the 60 year rotation. The oldest period is known as I; the youngest as III. The results show a gradual improvement in the distribution of the age-classes, as follows:

Actual Area 1909—Period I 40-60 years, 603.59 acres; period II, 20-40 years, 835.50 acres; period III 1-20 years, 187.76 acres. All ages (totals), 1,626.60 acres.

Actual Area 1919—Period I 40-60 years, 557.50 acres; period II 20-40 years, 858.44 acres; period III 1-20 years, 359.14 acres. All ages (totals), 1,775.08 acres.

The normal distribution would be for each period 542 acres in 1909 and 592 acres in 1919. Thus there is a gradual approach towards normality especially in building up the youngest age classes which were the most defficient. This will be even more marked as cutting proceeds more vigorously. Only 65 acres were cut in the ten years which is only one-tenth instead of the customary one-half of the area in the "first period."

The typography and general appearance of the bulletin is beyond praise. It is worthy of the institution the imprint of whose seal it bears.—*A. B. Recknagel.*

The Friendly Arctic, by Vilhjalmur Stefansson. (Macmillan) $6.00.

In this book Stefansson has abolished the heroics of Arctic exploration, and the book is all the more compelling a story for that very reason. Trying new theories meant entering deliberately on one of the most daring ventures in the history of exploration. Stefansson is in one person scientist, historian, philosopher and common-sense friend of man. By such an observer, with a mind free from fear and worry, the beauties and dangers and wonders of new places are described as by no other writer. The book carries a plot of human interest wherein scientists, whalers, Eskimos and explorers play their dramatic parts, and a reviewer has aptly said that "the Friendly Arctic makes a brilliant chapter in the progress of civilization."

A very attractive and interestingly written leaflet entitled "Little Bits of Sugar for the Birds" has been put out by the F. W. Kelsey Company, of New York. It deals with the desirability of preserving and protecting our game birds and advocates the planting of unused lands with native berry and fruit trees and shrubs so as to provide food and protection for such birds and at the same time utilize the land to good advantage.

INDIANA'S FORESTS

William A. Guthrie, chairman of the Indiana Conservation Commission, in addressing the lumbermen of his state, said:

"A little more than a century ago Indiana was covered with the finest hardwoods ever grown. In the recollection of many of us this state possessed vast timber areas which included white oak, poplar, walnut and gum.

"The most adaptable land for forestation in Indiana is in the southern part of the state. There are about 1,000,000 acres of the Ohio River watershed which are suited only for growing trees because the land is too rough for cultivation." He advocated the purchase of this land, some of which contains second-growth timber up to 20 years old, and he argued in favor of state and federal ownership. Individual ownership will never settle the forestation problem, Mr. Guthrie said, because timber is a long-time crop and the individual is hard to find who will invest heavily in a business that yields such slow returns.

In arguing for an Indiana forestation program, the speaker cited the record of other states along this line. Michigan has 855,000 acres of forest lands, he said. New York has 1,767,778 acres, and Massachusetts now is acquiring all available lands for reforestation.

Indiana has slightly more than 3,000 acres of state forest lands, on which the state conservation department is experimenting at growing hardwoods.

Much of the land in the southern part of the state which is available as the foundation for a future timber supply in this commonwealth can be obtained at from $2 to $10 an acre, Mr. Guthrie said. He ended his speech with a request for the cooperation of the members of the association in the forestry program of the State Conservation Commission.

GAVE ALMOST 3,000,000 TREES

The Pennsylvania Department of Forestry in 1921 distributed free 2,962,089 young forest trees. They were given to 1,091 owners of land in the State. It was the second largest annual distribution of forest trees in the history of the Department.

The leading varieties planted were white pine, Norway spruce, Scotch pine, Japanese larch, sugar maple, black locust, and white ash.

This fall the Department of Forestry gave away 190,833 trees to 125 applicants. Among the trees supplied were 2,048 ornamental trees, which averaged three feet in height. They were planted on the grounds of public schools, churches, and municipal parks. The Department will have about 3,500,000 trees for free distribution in 1922.

FORESTRY COMMITTEE OF AGRICULTURAL CONFERENCE

The Forestry Committee of the President's Agricultural Conference has reported a brief statement including general recommendations concurred in by the members of the committee which included in addition to Mr. Gifford Pinchot as chairman, Mr. A. W. Laird, of Potlatch, Idaho, president of the Western Forestry and Conservation Association; Mr. George W. Sisson, of New York, president of the American Paper and Pulp Association. Mr. C. H. Worcester, of Chicago, was also invited to participate. The report of the Forestry Committee of the conference contains no new information, but in general records the interest of those engaged in agriculture in adequate solution of the nation's forest problem.

REDWOOD GROVE DEDICATED

A grove of magnificent redwood trees in Humboldt County, California, has been dedicated to the memory of Col. R. C. Bolling, the first American officer of high rank killed in the World War. In an address at the dedication ceremony Madison Grant, councillor of the "Save the Redwoods League" said:—

"Let us on this solemn occasion in dedicating this grove of Redwoods to the memory of Colonel Bolling resolve that we shall continue the effort to preserve for those that come after us some portion of the heritage that was ours.

"No more destructive animal has ever appeared on the face of the earth than the American back-woodsman with his ax and his rifle. Since the Civil War, we have plundered half a continent. No such destruction since Caesar plundered Gaul has been accomplished in like time. In fifty years we have killed all the animals of the plain that in their millions had lived there for tens of thousands of years. The bison has long since gone, except where protected. The antelope is all but gone, the herds of elk are dwindling fast, and your mighty California grizzly is utterly extinct, so that even a battered skull is a highly prized trophy for a museum. The smaller animals and birds are many of them verging on extinction. Our fish in their abundance have utterly disappeared from many streams in the East, and if it were not for artificial restocking, would have entirely vanished. In many parts of the country, like the Red River Valley, the richest soil known to man has been exhausted in a generation.

"But bad as this slaughter of life has been, much of it can be restored if only we have a place of refuge for it when it is brought back. That refuge can be only the forests, and what have we done with our forests? Chopped them, and burned them, and wasted them: and now almost the last of the great stands of timber are here on the Pacific slope. We are in the center of the best of them. Probably nowhere on earth does there exist a forest to compare in continuous grandeur and unqualified beauty with the Redwoods that are found along the Eel River and to the north. We have reason to believe that no finer forest ever did exist on earth during the millions of years since vegetable life first appeared. It is, therefore, not merely a privilege, but it is a sacred duty for Americans to guard and to preserve what little is left of this heritage our fathers so cheerfully wasted. This is not a matter of sentimentalism. It is not a vague idealism. It is a reality. These trees are part of our national monuments, our national inheritance, of far more value to ourselves and to those who come after us than any of the works of man."

MAKING PACKING BOXES

Among the secondary wood-using industries the manufacture of packing boxes ranks first in New York State. This use of wood includes box shooks, packing boxes, piano and organ shipping boxes, packing crates, and all kinds of material used in the industrial establishments for storage and shipment of factory products, according to a bulletin issued by the New York State College of Forestry.

New York being the Empire State in manufacturing, the demand for boxes in which to crate and ship the output of the factories is naturally large. The annual consumption of lumber in the manufacture of boxes in New York amounts to 324,219,000 board feet. This surpassed the lumber used in planing mills by 94,000,000 feet in 1919, the last date for which comparative records have been obtained.

Adding to the amount of wood used in the class of containers, just described, may be placed baskets, berry crates, and minor packages which brings the quantity of lumber used up to 332,746,000 board feet. These figures do not include the cigar and tobacco box industry nor the wood used in cooperage.

LEHMAN CAVES NATIONAL MONUMENT

By a proclamation of President Harding, signed January 24, a 593-acre tract in the Nevada National Forest was set aside as the Lehman Caves National Monument. For twenty-five years these caves have been known locally, and for some time individuals have been trying to gain control of them, but the action of the Chief Executive retains them safely for all the people and prevents the destruction of the many objects of scenic and scientific value. The area remains a part of the National Forest, but the monument can be used for no purposes that interfere with its preservation as a national monument. It is the eleventh national monument to be established in a National Forest, and the first one in Nevada.

CALIFORNIA'S FIRE BILL

A million dollar loss to timber, range and grain was California's tribute to the fire demon during the past season, according to the annual fire report issued by the United States Forest Service and the California State Board of Forestry.

The report states that 2,245 fires were handled by the Federal Government and State organization. Information secured by these bureaus shows that in addition 293 grain fires burned within the State. The alarming and disconcerting fact that ninety percent of these fires result through carelessness and negligence of man, the officials of these bureaus state, deserves the serious attention of all Californians, particularly when the statistics indicate that 745 of these fires are directly chargeable to campers and smokers. As travel along the highways and in our mountains increases the public must exercise greater care with fire if our resources are not to suffer irreparable loss.

The report shows that the losses were made up of the following: Timber $67,-851.00, range $367,243.00, improvements $189,738.00, and hay and grain $370,506.00. The fire bill is further augmented by an item of $175,000.00 spent for fighting these fires. Six-hundred State and Federal officers are engaged in the difficult task of controlling the fires in California's forests and on the watersheds.

RESOLUTIONS BY THE PROFESSIONAL FORESTERS

The Society of American Foresters, being the organization of technical foresters in the United States, at its recent annual meeting at Toronto passed strong resolutions protesting against the proposed transfer of the United States Forest Service from the Department of Agriculture to some other department of the Government, stressing the close alliance of forestry with agriculture as both sciences are concerned with crop production, and the natural activity of the Forest Service in developing rural community life adjacent to the National Forests and through cooperation in fire protection under the terms of the Smith-Lever bill. A resolution regarding the necessity for special appropriations for pine blister control work was also passed, as was one urging the necessity of liberal support of forest research in the various branches of government devoted to this most important work.

PENNSYLVANIA RAILROAD PREVENTS FIRES

To prevent forest fires along their tracks, the railroads in Pennsylvania burned more than 1200 miles of safety strips during 1921, according to a statement issued by George H. Wirt, Pennsylvania's Chief Forest Fire Warden. The strips were cleared 100 feet wide on both sides of the tracks to stop fires from spreading to timberlands adjacent to railroads. The safety strip mileage constructed last year was far greater than during 1920, when the railroads first agreed to co-operate with the Department of Forestry in the removal of brush, forest litter, and other inflammable materials from the vicinity of tracks. Statements from the railroad officials show they spent about $65,000. The Pennsylvania Railroad and the Philadelphia and Reading Railway Company led in safety strip work during 1921. In the Weiser State Forest District, in Schuylkill, Carbon, Luzerne, and parts of Lebanon, Dauphin, Northumberland, and Columbia counties, there were built 506 miles of strips, more than 250 miles of them along the tracks of the Lehigh Valley Railroad.

PLANTING EXPERIMENTS ON REDWOOD CUT-OVER LANDS

The Forestry Division of the University of California is carrying on some interesting experiments in artificial reforestation in cooperation with the Union Lumber Company on cut-over lands north of Fort Bragg, Mendocino County. The planting work was started in February 1921, the planting site being a long strip across the watershed of Campbell Creek including a range of conditions typical of the redwood region. Among the more important trees being tested are Sugar Maple, Black Walnut, White Ash, Basswood, White Oak, Red Oak, Western Red Cedar and Douglas Fir. Direct seeding in spots was tried with several species as well as planting nursery grown seedlings. An examination in September showed 60-90 per cent survival for practically all species planted as seedlings but almost total failure for all seed spots.

Redwood sprouts vigorously from cut stumps and grows rapidly but under present logging conditions this does not result in a completely stocked stand of timber due to the large size of the trees cut and the comparatively small number of stumps per acre. It is hoped the above experiments will demonstrate that one or more valuable species can be successfully grown in association with redwood. Such associated species besides producing a valuable product will force the redwood to drop its lower branches and grow with the long bole so necessary to produce clear lumber.

As an example of how a fully stocked stand of redwood will grow in volume, a sample plot on bottom land in Mendocino County was measured in July 1921. This stand was fully stocked containing 258 trees per acre; because of its bottom land location the trees had escaped injury by fire and soil and moisture conditions were optimum for the region. In 50 years of

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AMERICAN FORESTRY will print, free of charge in this column, advertisements of foresters wanting positions, or of persons having employment to offer foresters. This privilege is also extended to foresters, lumbermen and woodsmen, discharged or about to be discharged from military service, who want positions, or of persons having employment to offer such foresters, lumbermen or woodsmen.

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growth this stand had produced in excess of 100,000 board feet per acre. A truly remarkable growth and indicative of the important role redwood lands, if properly managed, can play in quickly producing a large volume of timber. In order that maximum production may be realized two things are imperative; a fully stocked stand and protection of the young growth from fire. The planting experiments may help to solve the question of how to get a fully stocked stand, the fire protection can come only through concerted action on the part of land owners in cooperation with the state fire protection service.

"MARVELS OF SCIENCE"

Since forestry took on the habiliments of a science and engineers, chemists, and technicians began investigating forestry problems, such as the growth and protection of the forests, the harvesting of forest crops and the utilization of wood therefrom, many discoveries have been made that would seem almost without the pale of possibility, according to a bulletin of the New York State College of Forestry.

One of the scientific developments that may have an important bearing on the supply of automotive fuel of the future is the production of ethyl or grain alcohol from wood. Grain alcohol might be employed as a substitute for gasoline, provided it can be produced cheaply and engines adapted to its use but the practical application of this product like many other utilities that had their inception in the laboratory, must finally depend for its commercial development upon mechanical ingenuity and capital.

Sawdust can be converted into good fodder for cattle and farm stock. Other products of surprising variety and character are obtained either wholly or partially from wood, such as smokeless powder, linoleum, artificial silk, paint, varnish, soap, ink, celluloid, sausage casing, acetylene, chloroform, iodoform and many kinds of dyes and oils.

A new field has opened in scientific research with regard to the forests and their products. The results achieved in the last ten years would seem to indicate future developments that now are unimaginable. In fact, we can but dimly vision the infinite possibilities that lie ahead of scientific investigation in forest and wood problems. The time may come when wood will be more generally in demand for chemical purposes than for building material.

Many substitutes have been discovered for wood but the new uses have more than kept pace with the development of substitutes. What today is a dream will tomorrow be a reality. It would be rash, indeed, to prophesy how far scientists may go in working out new uses for wood and new methods of utilizing wood.

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